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The Effect of Teaching Style and Eye-Hand Coordination on Learning Outcomes in Tennis Field Groundstrokes

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Abstract

The purpose of this study was to find differences about the effect of reciprocal teaching style, practice style and the inclusion style, as well as the level of eye, hand and foot coordination of students on student learning outcomes of groundstrokes. The sample is students who are divided into groups who receive an exercise and reciprocal teaching style by considering the ability of eye, hand and foot coordination. This research uses 2x3 Factorial Design. The research population was 118 students, the research sample was taken based on Verduci's theory 27%, the category of high eye-hand-foot coordination group was students who included in the 27% highest score, the category of low eye-hand-foot coordination group was students who included in the lowest 27% score. Testing of eye, hand and foot coordination was carried out with a test of eye, hand and foot coordination. While the groundstroke ability is done by testing groundstrokes forehand and backhand. Based on the results of the test analysis, it was found that the overall teaching style of the group with high eye, hand and foot coordination had better results. There is an interaction between teaching style and eye, hand and foot coordination on the learning outcomes of groundstrokes.

Keywords
Innovation; e-government; local government; good government

I. Introduction

The coaching and development of educational sports is carried out through a learning process carried out by qualified sports teachers/lecturers who have competency certificates and are supported by adequate sports facilities and infrastructure (Kemenpora Republic of Indonesia, 2005:14). Field tennis skills are very much needed for alumni of the PJKR Department, in addition to teaching in schools, as a plus that can be used as capital to open a sports industry. Almost all students who take tennis lectures experience difficulties, so the game of tennis is often classified into difficult and complex types of skills. This is because tennis is influenced by other people or there are environmental factors that are difficult to control as stated (Vaverka, Nykodym, Hendl, Zhanel, & Zahradnik, 1: 2018) “tennis is influenced by numerous factors, including the technique and biomechanics of the serve. ". In addition, during a tennis game, the type of ball spin, the ball's bounce, direction, height, speed, and distance from which the ball falls are difficult for the recipient to predict in advance. A racket sport requires different techniques and Strategies. The ball travels faster around the court and thus requires quicker reflexes and proper technique to play effective shots “Tennis requires different techniques and strategies. The ball moves faster around the field and thus requires faster reflexes and proper technique to play an effective shot” (Singh, Ghai, & Amritashis, 5:2015).

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Development is a systematic and continuous effort made to realize something that is aspired. Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired. In addition, development is also very dependent on the availability of natural resource wealth. The availability of natural resources is one of the keys to economic growth in an area. (Shah, M. et al. 2020)

Specific kinematics of real tennis maneuvers performed on a variety of court surfaces must first be identified (Dunn, Goodwill, Wheat, & Haake, 861:2011).

The forehand groundstrokes technique is effectiveness is important for tennis success "the main technique to succeed as a tennis player" (Kwon, Pfister, Hager, Hunter, & Seeley, 2017: 505), and the backhand groundstrokes technique is one of the two basic groundstrokes in tennis and can be played both with one or two hands" (Genevois, Reid, Rogowski, & Crespo, 2014:194). Generally, forehand groundstrokes and backhand groundstrokes are considered as one of the most difficult techniques to master for students who are just learning basic tennis. The habit factor of the arm that is often used in daily activities.

To be able to have good basic technical skills requires a planned, programmed teaching style approach that is systematic, so that it will get automatic movements in playing tennis actually.

Table 1. Recapitulation of tennis scores in the last year of 2014 Study Program PJKR

No	Class	Years	Value								∑ %	Number of Students
			A	%	B	%	C	%	E	%		
1	A	2016	0	*0*	12	*54.55*	10	*45.45*	0	*0*	100	24
2	B	2016	4	28.57	4	28.57	5	35.71	1	7.14	100	14
3	C	2016	5	20.83	8	33.33	9	37.50	2	8.33	100	24
4	D	2016	6	27.27	6	27.27	8	36.36	2	9.09	100	22
5	E	2016	1	8.33	1	8.33	9	75.00	1	8.33	100	12
Amount			16	22.22	29	39.50	41	*43.06*	6	*8.33*	100	96

Based on the observations of researchers who are supported by other tennis lecturers in the department, most students get C and even E grades in tennis lectures can be influenced by several factors: First, the level of difficulty in performing basic techniques forehand groundstrokes and backhand groundstrokes, so the value obtained unsatisfactory because it is hampered by not mastering the forehand groundstrokes and backhand groundstrokes techniques. Second, the learning model does not vary so that the teaching and learning process in tennis lectures makes students bored, not active in carrying out the assigned tasks. Third, there is very little interest from students to add insight and knowledge about sports (especially tennis) and do not follow sports developments in the mass media, this is shown by the low visits to the faculty and university libraries. Fourth, low coordination between eyes, hands and feet when hitting the ball. Fifth, the low appreciation of students for the tennis course, which is indicated by the high percentage of students who do not meet the number of meetings. Sixth, the lack of time allocation in lectures. Seventh, the lack of a percentage of students to study independently outside of face-to-face lectures.

The results of the researchers' observations, which were supported by input from other tennis lecturers, were that teaching at the State University of Medan was different from teaching students from other regions. In the reciprocal teaching style, the student task

is predicting involves students in drawing inferences and using evidence from the text throughout the reading process. marked by the feedback between students as observers and actors, the teaching style with the practice of applying the lecturer explains and demonstrates the tasks of the backhand groundstrokes as a whole to students. While the inclusive teaching style of the lecturer in presenting the learning material as a whole is described in detail the level of difficulty, so that students are creative and get convenience in learning a movement skill, because students are given the freedom to choose and determine the level of difficulty where students start learning, and determine how many times students must repeat the movement in learning a movement technique in every meeting. According to Zainuddin in his research, there is a difference in the effect between reciprocal and inclusive training methods on overhead lob forehand technique skills in badminton, (Sports, Studies, Jasmani, Hamzanwadi, & Tgkm, 2017, p. 70).

In the learning process, in addition to studying learning theory and learning theory, there are other things that are also important to examine the correlation with the learning process and learning in tennis, which is related to eye, hand and foot coordination. Hand-eye coordination problems are usually first noted as a lack of skill and poor orientation. Hypertonia, a condition marked by an abnormal increase in muscle tension and a reduced ability of a muscle to stretch causes this co-ordination defect in humans“. (Pavithra, Ranjani, Sangeetha, Grace, & Somasundaram, 370: 2017)

Systematic and continuous learning and practice will improve the ability of eye, hand and foot coordination in tennis players, because it will have a stimulus effect to provide information, namely visual information arising from fixation on the target provides feedback that continually maintains and refines the movement as it is performed” (Vickers, Rodrigues, & Edworhty, 1:2000)

James' opinion on the operational implementation of technical skills and coordination exercises are: a) Identify the type of skills needed, such as fine skills, and shooting. b) develop a physical exercise program that is multilateral in nature to become the basis for developing technical skills, c) harmonize physical and technical training programs according to the needs of the sport concerned. Then Suharno in Imran added that coordination has the following characteristics: a) assembling several movements into one complete and harmonious movement, b) the existence of counter motions between one motion and another, synergistic and antagonistic muscle movements must be harmonious, c) movements of the right and left hands that are always in opposite directions, d) work in a stimulus and harmony between the nervous system, senses and muscles (James Tangkudung and Wahyuningtyas P, 65: 2012). The key to coordination is the existence of a series of different movements.

In this research study, it will be revealed about how to use a good and appropriate teaching style for the success of learning the basic backhand groundstrokes technique which of course requires concrete data about the level of success of that teaching style. The usefulness of the results of this study can provide knowledge about the implementation of teaching using reciprocal teaching styles, and teaching styles Exercise in learning motion in higher education, especially the skill of groundstrokes in the game of tennis. In addition to this, it will also provide an understanding that the learning process cannot be separated from high eye, hand and foot coordination in order to achieve learning objectives quickly and precisely.

Not only useful for educators, but for coaches and sports coaches, the results of this study provide knowledge that movement teaching styles must be varied in order to get better results, so that teaching does not seem monotonous and boring which leads to a weakening of students' learning motivation.

II. Review of Literature

This study aims to obtain an overview of the differences between the independent variables and the dependent variable. There are three independent variables in this study, namely teaching style and eye, hand and foot coordination. As the dependent variable is the result of learning groundstrokes.

The quantitative strategy works on objectives and measures them through the actions and opinions which helps the researcher to describe the data rather than interpret the data. (Rahi, 2017:2). Quantitative research methods, on the other hand, involve a larger sample, and do not require relatively a longer time for data collection (Rahman, 2016:102). The method used in this study is an experimental method with a 2 x 3 factorial design.

Table 2. 2 x 3 . Factorial Design

Teaching Style (A) / **Eye Hand Foot Coordination (B)**	**Reciprocal (A_1)**	**Exercise (A_2)**	**inclusion (A_3)**
Tall (B_1)	A_1B_1	A_2B_1	A_3B_1
Low (B_2)	A_1B_2	A_2B_2	A_3B_2
Total	**A_1**	**A_2**	**A_3**

So that the results of this study really show as a result of the treatment given, it is necessary to control the external variables that affect the learning outcomes of groundstrokes. The control in question is the control of internal and external validity referring to Anne's opinion (Anne L. Rothstein L, 1985:60-74). Internal and external validity controlled in this study, will be explained further.

Sugiyono said "Population is a generalization area consisting of: objects/subjects that have certain qualities and characteristics determined by researchers to be studied and then drawn conclusions" (Sugiyono, 2010:80). The target population in this study were all students of the PJKR FIK Unimed study program, while the affordable population was determined by the 4th semester (four) students of the 2015 FIK Unimed Study Program, consisting of four classes, namely PJKR A, B, C, and D.

Table 3. Total Population of PJKR FIK Unimed Study Program Class of 2015

No	**Class**	**Class of the Year**	**Number of Students**
1	A	2015	30
2	B		30
3	C		29
4	D		29
Amount			118

The sample is part of the number and characteristics possessed by the population. The sample of this research was taken by using purposive sampling technique. Wiratna Sujarweni said purposive sampling is a sampling technique with certain considerations or criteria (Wiratna Sujarweni, 2012:14). With a population of 118 students. The population was given a test of eye, hand and foot coordination with tests and measurements. The results of the coordination test were ranked 1 - 118. From 118 students the level of coordination was measured based on Verducci's opinion on the following calculations:

1. The category of high eye-hand-foot coordination group is students who are included in the 27% highest score.
2. The category of low eye-hand-foot coordination group is students who are included in the 27% lowest score (Frank M. Ferducci, 1980:176).

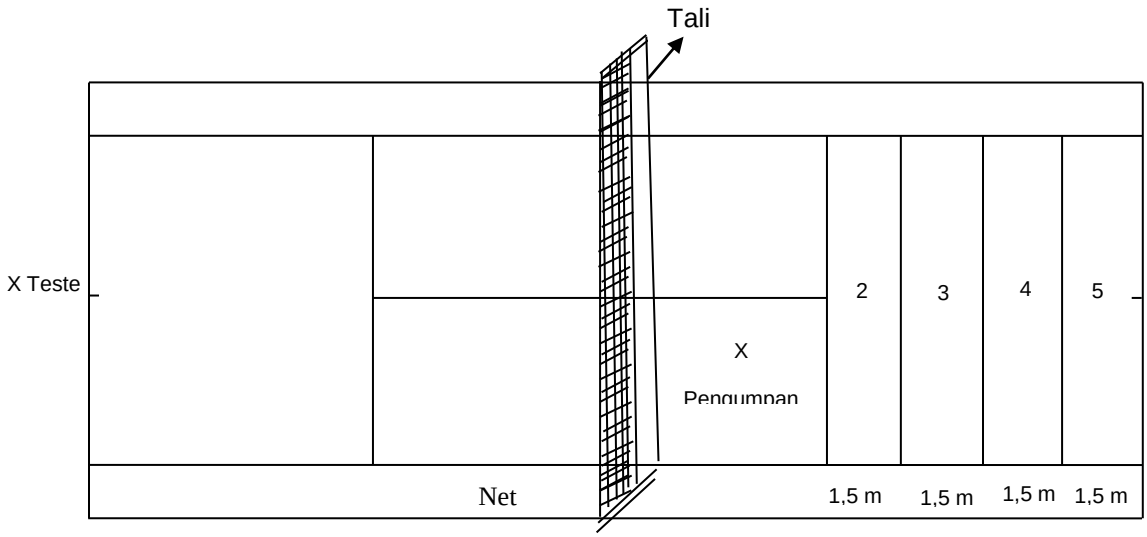
From the results of the test, the rankings were then taken 27% from the top as the group with high eye-hand-foot coordination and 27% from the bottom as the group having low eye-hand-foot coordination. Meanwhile, those that are not included in the upper 27% and lower 27% are not used because they clarify the difference between the upper and lower samples. Furthermore, dividing the sample into three groups, namely the group that uses the reciprocal teaching style of group I and the group that uses the exercise teaching style of group II and group III the inclusive teaching style that has been tested for the level of coordination.

The calculation of the percentage above is 31.86 rounded up to 31 samples from students who have high eye-hand-foot coordination. 31.86 were rounded up to 31 sample students who had low eye-hand-foot coordination, so that the total sample size was 62 students. From these results, then divided into six groups and each group consists of 10 people, in this study the sample was taken to be 10 students, because of the 62 who were netted, 1 (one) student was already a student of the Unimed Tennis Club.

Table 4. Grouping of Experimental Samples

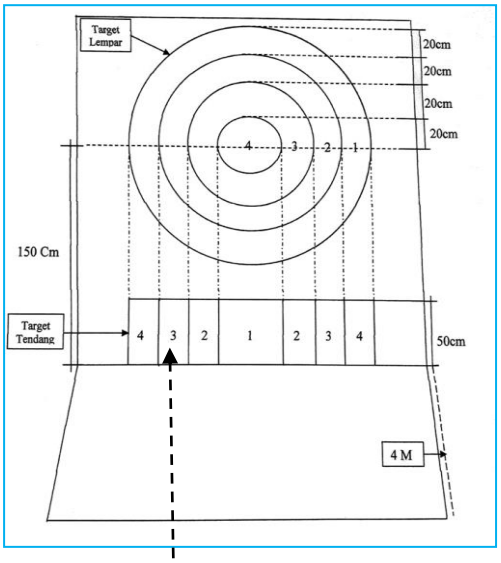
Teaching Style (A) / **Eye Hand Foot Coordination (B)**	**Reciprocal (A_1)**	**Exercise (A_2)**	**inclusion (A_3)**	**Total**
Tall (B_1)	10	10	10	30
Low (B_2)	10	10	10	30
Total	**20**	**20**	**20**	**60**

Groundstrokes forehand and backhand test field :



Source : Nurhasan. Tests and Measurements in Physical Education, Jakarta : Ministry of National Education, 2001

Figure 1. *Forehand and backhand groundstrokes test field*



Source: Indonesian Journal of Physical Education

Throw and Kick/Kick Boundaries

Figure 2. *Eye, Hand and Foot Coordination Test*

(Yogyakarta; UNY Vol 10 No. 1 April 2014)

III. Result and Discussion

Table 5. Summary of Statistical Calculation Results

Teaching Style	Coordination	Mean $(\bar{x})$	Std. Deviation	N
Reciprocal	Tall	33,30	1,567	10
	Low	31,70	1,252	10
	Total	32,50	1,606	20
Exercise	Tall	35,60	1,075	10
	Low	31,60	1,506	10

	Total	33,60	2,415	20
inclusion	Tall	28,70	1,252	10
	Low	33,00	1,247	10
	Total	30,85	2,519	20
Total	Tall	32,53	3,181	30
	Low	32,10	1,447	30
	Total	32,32	2,460	60

It is known that the average learning outcomes of groundstrokes in the tennis game group of students who are taught using a reciprocal teaching style get a score that is 32.50 lower than the exercise teaching style with an average score of 33.60 and higher when compared to inclusive teaching style is 30.85. Based on the group of students who have high eye, hand and foot coordination, the average value of learning outcomes on groundstrokes taught by reciprocal teaching style is 33.30 better than students taught with inclusive teaching style 28.70 and less than exercise teaching style 35 ,60. For reciprocal, practice and inclusive teaching styles, the average learning outcomes of groundstrokes who have low eye, hand and foot coordination taught using the inclusive teaching style are 33.00 higher than the average learning outcomes of groundstrokes taught using the inclusive style. teaching reciprocal 31.70, and teaching style exercise 31.60.

3.1 Results of Groundstrokes Treated with Reciprocal Teaching Style in a Group of Students with High Eye, Hand and Foot Coordination. (Group A1B1).

Data on the results of groundstrokes treated with reciprocal teaching styles in groups of students who have high eye, hand and foot coordination. Obtained a range between 31 to 36, there is an average price of 33.30 and a standard deviation of 1,567.

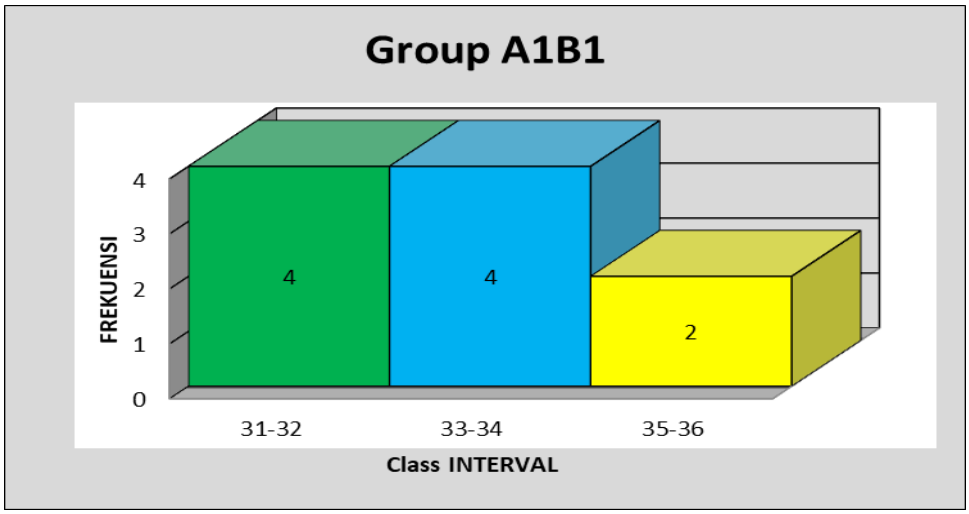


Figure 3. *Histogram of groundstroke results treated with reciprocal teaching styles in a group of students who have high eye, hand and foot coordination.*

3.2 Results of Groundstrokes Treated with Reciprocal Teaching Style in Groups of Students with Low Eye, Hand and Foot Coordination. (Group A1B2).

From the data on the results of groundstrokes treated with reciprocal teaching styles in groups of students who have low eye, hand and foot coordination. The range is obtained from 30 to 34, there is an average price of 31.70 and a standard deviation of 1,252. There are 4 students or 40% who get groundstrokes below the average, 5 students or 50% on the

average, and there is 1 student or 10% above the average. This provides an overview of the achievement of groundstrokes that are treated with reciprocal teaching styles in groups of students who have low eye, hand and foot coordination in the good category.

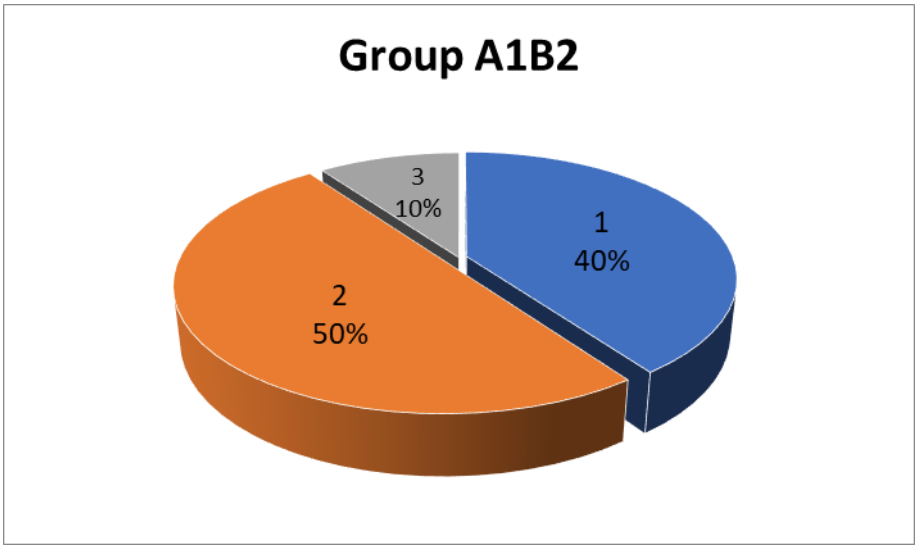


Figure 4. *Percentage of outcomes for groundstrokes treated with reciprocal teaching styles in groups of students who have low eye, hand and foot coordination.*

3.3 Results of Groundstrokes Treated with Exercise Teaching Style for Groups of Students with High Eye, Hand and Foot Coordination. (Group A2B1)

Data on the results of groundstrokes treated with exercise teaching style in a group of students who have high eye, hand and foot coordination. The range is obtained from 34 to 37, there is an average price of 35.60 and a standard deviation of 1.075.

3.4 Results of Groundstrokes Treated with Exercise Teaching Style in a Group of Students with Low Eye, Hand and Foot Coordination (Group A2B2).

Data on the results of groundstrokes treated with exercise teaching style on a group of students who have low eye, hand and foot coordination. The range is obtained from 29 to 34, there is an average price of 31.60 and a standard deviation of 1.506. Data on the results of groundstrokes treated with exercise teaching style on a group of students who have low eye, hand and foot coordination. The range is obtained from 29 to 34, there is an average price of 31.60 and a standard deviation of 1,506.

3.5 Groundstroke Results Given Inclusive Teaching Style Treatment for Groups of Students Who Have High Eye, Hand and Foot Coordination. (Group A3B1).

Data on the results of groundstrokes treated with inclusive teaching styles in groups of students who have high eye, hand and foot coordination. The range is obtained between 27 to 31, there is an average price of 28.70 and a standard deviation of 1,252.

3.6 Results of Groundstrokes Treated with Inclusive Teaching Style in a Group of Students with Low Eye, Hand and Foot Coordination (Group A3B2).

Data on the results of groundstrokes treated with inclusive teaching styles in groups of students who have low eye, hand and foot coordination. Obtained a range between 31 to 35, there is an average value of 33 and a standard deviation of 1,506.

n

Table 6. *Tests of Between-Subjects Effects*
Dependent Variable: Court tennis groundstrokes learning outcomes

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	**261,883[a]**	**5**	**52,377**	**29,741**	**0,000**
Intercept	62662,017	1	62662,017	35580,956	0,000
A	76,633	2	38,317	21,757	0,000
B	2,817	1	2,817	1,599	0,211
A * B	**182,433**	**2**	**91,217**	**51,795**	**0,000**
Error	95,100	54	1,761		
Total	63019,000	60			
Corrected Total	356,983	59			

a. R Squared = ,734 (Adjusted R Squared = ,709)

Line A * B as a result of the interaction between teaching style and eye, hand and foot coordination on the learning outcomes of groundstrokes in tennis, the Mean Square value is 91.217, F (AB) = 51.795, R-Square is 0.734 and Sig = 0.000 . These results indicate that the Sig value obtained in the Two-Way ANOVA analysis above is less than 0.05 or 0.000 <0.05. Thus, based on the test criteria above, H0 is rejected and H1 is accepted, meaning that there is an interaction between teaching style and eye, hand and foot coordination on the learning outcomes of groundstrokes for students of the PJKR FIK Unimed Medan study program.

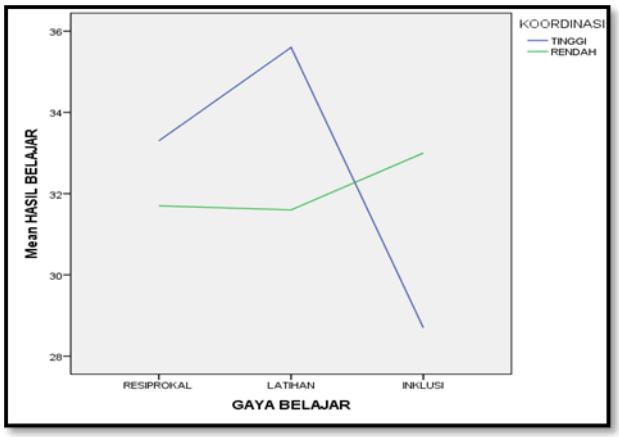


Figure 5. *Graph of interaction between teaching style and eye, hand and foot coordination on learning outcomes of groundstrokes in court tennis*

The findings and recommendations of this study are that the practice teaching style proves to be better than the reciprocal teaching style in improving groundstroke technique. Therefore, it is preferred to be able to improve the tennis groundstrokes technique, the right choice is to use an exercise teaching style with eye, hand and foot coordination skills are one of the important things to acquire.

IV. Conclusion

Based on the results of research and discussion that have been stated, there are several things that can be concluded, namely as follows:

1. There is a significant difference in the process of groundstroke in tennis, between a group of students who were treated with a reciprocal teaching style and a group of students who were treated with an exercise teaching style.
2. There is a significant difference in the process of groundstroke in tennis, between the group of students who were treated with reciprocal teaching styles and the group of students who were treated with inclusive teaching styles.
3. There is a significant difference in the process of groundstroke in tennis, between the group of students who were treated with the exercise teaching style and the group of students who were treated with the inclusive teaching style.
4. There is an interaction between teaching style and eye, hand and foot coordination on the learning outcomes of groundstrokes skills of PJKR FIK Unimed Medan students.
5. There are differences in the learning outcomes of groundstrokes skills using a reciprocal teaching style with an exercise teaching style that has high eye, hand and foot coordination for PJKR FIK Unimed Medan students.
6. There are differences in the learning outcomes of groundstrokes skills using reciprocal teaching styles with inclusive teaching styles that have high eye, hand and foot coordination of PJKR FIK Unimed Medan students.
7. There is a difference in the learning outcomes of groundstrokes skills between those who use an exercise teaching style and an inclusive teaching style that has high eye, hand and foot coordination of PJKR FIK Unimed Medan students.
8. There is no difference in learning outcomes for groundstrokes skills using a reciprocal teaching style with an exercise teaching style that has low eye, hand and foot coordination for PJKR FIK Unimed Medan students.
9. There are differences in the learning outcomes of groundstrokes skills using a reciprocal teaching style with an inclusive teaching style that has low eye, hand and foot coordination for PJKR FIK Unimed Medan students.
10. There is a difference in the learning outcomes of groundstrokes skills between those who use an exercise teaching style and an inclusive teaching style that has low eye, hand and foot coordination for PJKR FIK Unimed Medan students.

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