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The Effect Differences of Learning Approach, Hitting Distance, and Kinesthetic Perception on Tennis Groundstroke Ability

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Abstract

AIM: The purpose of this study was to determine the difference in the effect of the learning approach, hitting distance, and kinesthetic perception on the ability of tennis groundstrokes.

METHODS: In conducting this research, researchers used an experimental method with a 2 × 2 × 2 factorial design. The research sample was 40 athletes with a purposive random sampling technique. The data collection technique used was a kinesthetic perception test and a tennis groundstroke ability test. The analysis technique used was Analysis of Variance at the significance level α = 0.05.

RESULTS: The results showed that (1) There is a significant difference in the effect of the learning approach on the groundstroke ability of tennis court with the calculated F value (Fo) = 4.941 greater than F table (Ft) = 3.26, (2) There is no significant difference between the fixed hitting distance and the gradual hitting distance on the ability of tennis groundstrokes with the calculated F value (Fo) = 2.196 which is smaller than F table (Ft) = 3.26, (3) There is a significant difference in the effect between students who have good kinesthetic perception and less kinesthetic perception on tennis groundstroke ability with the calculated F value (Fo) = 11.473 greater than F table (Ft) = 3.26, (4) There is no interaction between the learning approach and hitting distance on the ability of tennis groundstrokes with the calculated F value (Fo) = 3.238 which is smaller than F table (Ft) = 3.26, (5) There is no interaction between the learning approach and the kinesthetic perception of tennis groundstroke ability with the calculated F value (Fo) = 0.908 which is smaller than F table (Ft) = 3.26, (6) There is no interaction between hitting distance and kinesthetic perception on the ability of tennis groundstrokes with the calculated F value (Fo) = 2.868 which is smaller than F table (Ft) = 3.26, (7) There is an interaction between the learning approach, hitting distance, and students' kinesthetic perceptions of the tennis groundstroke ability with the calculated F value (Fo) = 9.423 greater than F table (Ft) = 3.26.

CONCLUSION: Overall, there is an interaction between the three variables of the training model, meaning that the learning outcomes of the tennis groundstroke ability are obtained due to regular exercise. The achievement of the groundstroke ability of the tennis court due to the application of the learning approach is directly influenced by the difference between the distance and the difference in the student's kinesthetic perception.

Introduction

Sports are all systematic activities to encourage, nurture, and develop physical, spiritual, and mental potential [1]. The objectives of national sports according to Indonesian Law Number 3 of 2005 Article 4 which mentions "National sports are aimed at maintaining and improving health and fitness, achievement, human quality, instilling moral values and noble morals, sportsmanship, discipline, strengthening and fostering national unity and integrity, strengthening national resilience, and uplifting the dignity and honor of the nation." To achieve these national goals, there are three scopes of sports enhancement and development including: (1) educational sports, (2) recreational sports, and (3) elite sports.

Educational sports are physical education and sports which are carried out as a regular and sustainable educational process to acquire knowledge, personality, health skills, and physical fitness (*Indonesian Law Nb. 3 Year 2005 Concerning the National Sports System*, 2005) [1].

Education is a conscious and planned effort to create an atmosphere of learning and the 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, the nation as well as the State (Indonesian Law number 20 Year 2003 concerning the National Education System article 1 paragraph 1) [2]. One of the efforts to achieve the goals of national education is through education at the tertiary level where the learning system is implemented through a subject approach.

Sports Coaching Education (PKO) is a department that has a scientific concentration in the field

of sports education and coaching. Students majoring in sports are expected to become sports teachers and coaches. The Sports Coaching Education Department offers several practical sports courses, including athletics, badminton, basketball, soccer, gymnastics, sepaktakraw, and tennis.

Based on the interviews with students who take part in learning activities in the PKO department, one of the sports practice courses in the PKO Department is a tennis course. Tennis courses are presented in 2 semesters, namely tennis I and tennis II. In tennis I course, students learn about the basic techniques and rules of playing tennis. In tennis 1 course, students learn the basic techniques of tennis hitting. The basic techniques are forehand and backhand groundstroke, forehand and backhand volley, serve, and smash. In tennis 2 course, students focus more on practicing forehand and backhand groundstroke.

The results of the research team's observations on the tennis courts, there were still students who had difficulty in practicing groundstroke. Most of the students have difficulty combining the strokes and footwork. When students practice the forehand and backhand groundstrokes by being fed and without steps, the students can carry out the strokes well, but when combined with steps, the hitting position of some students is not correct.

This condition needs to be addressed by providing the right learning approach. The learning approach must be in accordance with the objectives of each practice session. By applying the appropriate learning approach, it is hoped that it will be able to improve student's learning outcomes in improving tennis groundstroke abilities. Learning approaches that can improve students' ability in playing tennis include blocked practice and random practice approaches.

For example, an athlete wants to learn three different tasks, for example three different strokes in tennis (e.g., serve, groundstroke, and volley). An approach was then applied by providing a fixed duration limit for the trainees to carry out the first task before practicing based on the next task. Then the athlete will spend another period of time doing the second exercise before moving on to the third exercise. This kind of training approach is called blocked practice, where a substantial portion of the participant's training time is fully spent on completing one task before starting the next exercise. Blocked practice is especially seen during practice, where participants perform the same movements over and over again. In the blocked practice system, the training system runs from the easy to the complex aspects.

Random practice is the other form of practice that has been extensively researched. It doesn't mean you assign random drills, it simply means that instead of practicing one particular stroke over and over, a number of different skills are practiced in a mixed manner. In random practice, for example, a sequence of exercises for a number of different tasks is mixed during practice time. Athletes take turns continuously practicing the tasks and, in most cases, they only do it once, no repetition.

This movement must be done well and consciously, where a tennis athlete must know the body parts involved and have good concentration. In this case, an athlete must be able to feel and predict how to make a ready position, predict the arrival of the ball, take steps in the direction of the ball, swing the racket back before the ball arrives, hit the ball right on the surface of the racket string, make further movements and return to the initial stance position. It is hoped that this movement can be carried out correctly so that the strokes produced can make the opponent hard to return.

The game of tennis has a variety of basic strokes that a player must master, namely, forehand, backhand, volley, serve, and smash. To be able to play tennis well, a tennis player must be able to master various basic principles, such as: (1) Looking at the ball carefully, (2) anticipating the direction of the ball, (3) anticipating strokes, (4) performing proper footwork, (5) having steady balance, (6) having responsive move on racket and ball, and (7) concentration.

The implementation of this exercise can be applied in various forms of training. In fact, coaches still do a lot of drill training methods to be applied to all players, one of which is the method used by Jones and Angela Buxton. In the training process, the hitting distance can be done from a distance of 2 or 3 yards from the net, close to the service line, between the service line and the baseline, and from the baseline (Jones dan Angela Buxton, 1982:39) [3].

Kinesthetic sensitivity is the awareness of a person in carrying out a movement or activity. This means that the kinesthetic perception possessed by a tennis athlete will be able to support the improvement of tennis groundstroke abilities. According to Sugiyanto and Sujarwo (1992:227) [4] that, "Kinesthetic perception has an important role because kinesthetic perception is an element of physical ability that allows a person to realize the position of the body and the movements."

The unknown difference in the effect of learning approaches, hitting distance and kinesthetic perception is an interesting phenomenon to study. So it is necessary to do research to answer whether it is true that the learning approach, hitting distance, and kinesthetic perception can affect the increase in the ability of tennis groundstrokes.

Based on the background of the problems, the authors were interested in conducting a study entitled "The Effect Differences of Learning Approach, Hitting Distance, and Kinesthetic Perception on Tennis Groundstroke Ability."

Research Methods

Research design

The approach taken in this research is a quantitative approach, using the experimental method. Experimental research aims to determine the possibility of the effect (causal effect) on the situation or phenomenon under study. Experimental research can be defined as an objective, systematic, and controlled study to predict or control phenomena. Experimental research aims to investigate cause and effect relationships, by exposing one or more experimental groups and one or more experimental conditions [5].

The research design used in this study was a 2 × 2 × 2 factorial research design, in which to determine the effect of variables and variable level combinations, as well as the influence of the interaction between factors on improving male students' ability to play tennis.

Sujana (1988:87) [6] defines a factorial experiment is an experiment in which all (almost all) levels of a certain factor are combined with all (almost all) levels of every other factor contained in the experiment. According to Sujana (1994: 124–128) [7], experimental design based on factorial 2 × 2 × 2 is where each independent variable is classified into 2 levels. The variables in this study include three factors or independent variables whose effects are examined on the dependent variable, namely, the ability of tennis groundstroke. The independent variables include the learning approach, hitting distance, and kinesthetic perception, each of which is independent variable consisting of two levels: (1) The learning approach variables consist of blocked practice and random practice, (2) the hitting distance variable consists of a fixed hitting distance and stages hitting distance, and (3) the kinesthetic perception variable consists of good kinesthetic perception and poor kinesthetic perception.

Data collection techniques and research instrument

The techniques and data collection tools or research instruments referred to in this study are the instruments used to collect data, namely:

1.	Test of tennis groundstroke ability
The result of learning tennis groundstroke is the result of learning from the treatment given to the experimental person, the mastery of the ability of the tennis groundstroke, which includes the Forehand Groundstroke and the Backhand Groundstroke. After students receive the treatment, it would be known how much improvement is obtained.

2.	Test of kinesthetic perception
The data collection technique used in this study was kinesthetic perception measured by the perception distance jump test by Johnson *et al*. (1986: 441) [8]. Kinesthetic perception data were measured twice, before the treatment was given.

3.	Technique in collecting data
The research data collection technique was carried out with the following regulated procedures: (1) Preparing sample; (2) preparing facilities and infrastructure as well as equipment used during the research; (3) determining time of research; and (4) data retrieval which includes skills tests to play tennis at the beginning and at the end of training activities. The implementation of test was carried out in each school.

Technique in analyzing data

The data analysis technique used was the two-way analysis of variance (ANOVA) technique at $\alpha = 0.05$. If the F value obtained (Fo) is significant, the analysis is continued with a follow-up test (*post hoc*) using the *post hoc* Anaylisi Test-Tukey (Trihedradi, 2005: 173). To fulfill the assumptions in the ANOVA technique, the normality test (Kolmogorov–Smirnov test) [9] and the Homogeneity Variance test (with the Lavene'Test) were carried out (Trihedradi, 2005: 170) [10]. Analysis with the help of SPSS 16.00 for windows. The sequence of data analysis steps in this study was;

Post hoc

To observe the difference in the mean value between groups with the *post hoc t* test, the researchers used Tukey method analysis. The test results would provide information that there was a significant mean difference due to the effect of learning blocked practice and random practice approaches on tennis groundstroke skills. Further test results were seen from the significant value (α), if all significant values (α) <0.05 then all have a significant difference.

Findings

This chapter provides data about the research results and their interpretation. This experimental research involved two variables, consisting of the independent variable and the dependent variable. The independent variables consist of learning approach, hitting distance, and kinesthetic perception. The learning approach and hitting distance are manipulated variables while kinesthetic perception is the attributive variable. The dependent variable is the groundstroke ability of the tennis court. Presentation of data descriptions can be seen in attachment 5.

Each independent variable has two levels. The learning approach variable has two levels; the blocked practice and random practice approaches, while the hitting distance has two levels, the fixed interval and the gradual hitting distance. Meanwhile, attributive independent variables have two levels; good kinesthetic perception and less kinesthetic perception.

The presentation of the research results is based on statistical analysis carried out on the results of the male students' groundstroke test, majoring in Sports Coaching Education, Faculty of Sports Science, Universitas Negeri Semarang. The descriptions of the research data are shown in Figure 1, Tables 1-7.

Explanation:

1. a1b1c1: Blocked practice learning, fixed hitting distance, good kinesthetic perception
2. a1b1c2: Blocked practice learning, fixed hitting distance, lack of kinesthetic perception
3. a1b2c1: Blocked practice learning, gradual hitting distance, good kinesthetic perception
4. a1b2c2: Blocked practice learning, gradual hitting distance, and lack of kinesthetic perception
5. a2b1c1: Random practice learning, fixed hitting distance, and good kinesthetic perception
6. a2b1c2: Random practice learning, fixed hitting distance, and lack of kinesthetic perception
7. a2b2c1: Random practice learning, gradual hitting distance, and good kinesthetic perception
8. a2b2c2: random practice, gradual hitting distance, and lack of kinesthetic perception
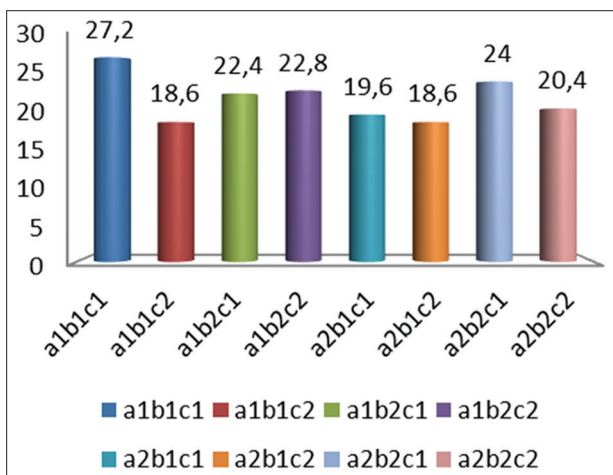

Figure 1: Histogram of tennis groundstroke test result

In detail, the description of the data that has been contained in the table and histogram above can be described as follows:

1. The results of the male student tennis groundstroke ability test group with blocked practice learning approach, fixed hitting distance, and good kinesthetic perception (a1b1c1). Based on the table above, it is known that $\bar{X}$ = 27.20. SD = 1.92 and n = 5. There are 2 students who have the above average groundstroke ability, and 3 students are below the average.

2. The results of the groundstroke ability test for male students in the blocked practice learning approach group, fixed hitting distance, and poor kinesthetic perception (a1b1c2). Based

on the table above, it is known that $\bar{X}$ = 18.60 SD = 1.67 and n = 5. There are three students who have the above average groundstroke ability and two students are below the average.

3. The results of the male students' groundstroke test in the blocked practice approach group, gradual hitting distance and good kinesthetic perception (a1b2c1). Based on the table above, it is known that X = 22.40 SD = 3.36 and n = 5. There are 2 students who have the above average groundstroke ability and three students are below the average.

Table 2: Data description of tennis groundstroke based on learning approach

Learning approach	
Block learning approach	Random learning approach
x̄ = 22.75	x̄ = 20.65
SD = 4.20	SD = 3.39
n = 20	n = 20

4. The results of the male students' groundstroke ability test in the blocked practice approach group, gradual hitting distance and poor kinesthetic perception (a1b2c2). Based on the table above, it is known that $\bar{X}$ = 22.80 SD = 4.44 and n = 5. There are 3 students who have the above average groundstroke ability, and two students are below the average.

Table 3: Data description of tennis groundstroke based on hitting distance

Hitting distance	
Fixed hitting distance	Gradual hitting distance
x̄ = 21.00	x̄ = 22.40
SD = 4.51	SD = 3,16
n = 20	n = 20

5. The results of the groundstroke ability test for male students in the random practice learning approach group, fixed hitting distance and good kinesthetic perception (a2b1c1). Based on the table above, it is known that $\bar{X}$ = 19.60 SD = 4.56 and n = 5. There are four students who have the groundstroke ability above the average, and one student is below the average.

Table 4: Data description of tennis groundstroke based on kinesthetic perception

Kinesthetic perception	
Good kinesthetic perception	Poor kinesthetic perception
x̄ = 23.30	x̄ = 20.10
SD = 4.11	SD = 3.02
n = 20	n = 20

6. The results of the groundstroke ability test for male students in the random practice learning approach group, fixed hitting distance, and poor kinetic perception (a1b1c2). Based on the table above, it is known that $\bar{X}$ = 18.60 SD = 1.67 and = 5. There are three students

Table 1: 2×2×2 factorial design research

Jarak pukul (B)	Persepsi kinestetik (C)	Pendekatan pembelajaran (A)	
		Blocked practice (A1)	Random practice (A2)
Tetap (B1)	Baik (C1)	a1b1c1	a2b1c1
	Kurang (C2)	a1b1c2	a2b1c2
Bertahap (B2)	Baik (C1)	a1b2c1	a2b2c1
	Kurang (C2)	a1b2c1	a2b2c2

who have the above average groundstroke ability, and two students are below the average.

Table 5: Normality test

Tests of normality						
Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Score						
a1b1c1	0.141	5	0.200*	0.979	5	0.928
a1b2c1	0.147	5	0.200*	0.995	5	0.994
a1b1c2	0.201	5	0.200*	0.881	5	0.314
a1b2c2	0.290	5	0.197	0.795	5	0.073
a2b1c1	0.335	5	0.069	0.860	5	0.228
a2b2c1	0.247	5	0.200*	0.942	5	0.679
a2b1c2	0.228	5	0.200*	0.932	5	0.607
a2b2c2	0.237	5	0.200*	0.961	5	0.814

7. The results of the groundstroke ability test for male students in the random practice learning approach group, gradual hitting distance and good kinesthetic perception (a2b2c1). Based on the table above, it is known that $\bar{X}$ = 24.00 SD = 2.65 and = 5. There are two students who have the groundstroke ability above the average, and three students are below the average

Table 6: Homogeneity test

Levene statistic	df1	df2	Sig.
1.973	7	32	0.090

8. The results of the groundstroke ability test for male students in the random practice learning approach group, gradual hitting distance and poor kinesthetic perception (a2b2c2). Based on the table above, it is known that $\bar{X}$ = 20.40 SD = 1.14 and n = 5. There are two students who have the above average groundstroke ability, and three students are below the average.

Table 7: Summary of average groundstroke ability learning outcomes

Learning approach	Hitting distance	Kinesthetic perception	Mean	SD	n
Blocked practice	Fixed hitting distance	Good	27.20	1.92	5
		Poor	18.60	1.67	5
	Gradual hitting distance	Good	22.40	3.36	5
		Poor	22.80	4.44	5
Random practice	Fixed hitting distance	Good	19.60	4.56	5
		Poor	18.60	2.19	5
	Gradual hitting distance	Baik	24.00	2.65	5
		Poor	20.40	1.14	5
Total			21.70	3.92	40

A. Requirements testing

Before the data analysis was carried out, the analysis prerequisite test was carried out such as the normality test and the homogeneity test.

1. Normality test

Data analysis needs to be tested for normal distribution using the Lilliefors approach. The results of the data normality test carried out in each group are as follows:

2. Homogeneity test

The homogeneity test is intended to test for the similarity of variants between groups. Homogeneity test used in this study is the Levene Test. The results of the data homogeneity test between groups are as follows:

From the table above, based on the Levene Test, it is found that the sig = 0.090>0.05 (P>0.05), it can be stated that the data comes from a population with homogeneous variants.

B. Hypothesis testing

The research hypothesis was tested by using the ANOVA technique. For the purposes of hypothesis testing, data analysis was carried out by using ANOVA, three-way ANOVA. All calculations (computations) were performed by using the SPSS 16 Statistical Program.

This calculation technique aims to determine the main effect of treatment on the experiment (main effect) and to determine the effect of the interaction (interaction effect). If there is a difference, then to find out which variable is more effective, a further test is carried out using the Tukey test.

Discussion

The discussion in this study provides a further interpretation of the results of the data analysis that has been stated. Based on hypothesis testing, it has resulted in the following analysis:

1. The effect between blocked practice learning approach and random practice learning approach on tennis groundstroke ability

In the training process, blocked practice learning is recommended by experts, especially the blocked practice learning approach where the development of focused abilities is more emphasized on students to be more focused on mastering a stroke.

In the blocked practice learning approach, students will focus more on learning a movement and be able to feel the ball's reflection against the racket repeatedly and produce good and accurate strokes, so that the learning objectives will be achieved more quickly, students can do forehand and backhand groundstroke better.

From the theory and results of this study, it is evident that the blocked practice approach is better than the random practice learning approach. This shows that the blocked practice learning approach is the basis for starting the learning phase for students majoring in sports coaching education department, where students will start learning with the aim of getting as much movement experience as possible and focused on one lesson. The fun exercise menu is accompanied by interactions between individuals so that the obstacles to boredom in blocked practice

learning will be resolved. Learning can be done in conjunction with technical exercises and with an approach to the real game.

On the other hand, the practice of the random practice learning approach that is random is felt to be less likely to provide more experience of movement so that students do not master one motion and furthermore it will affect the achievement of less maximal groundstroke ability.

2. The influence between fixed hitting distance and gradual hitting distance on tennis groundstroke ability

Essentially, the hitting distance functions as a stimulus and elicits a response from the athlete's body. The hitting distance is in accordance with the training theory which explains that training starts from simple to complex and from easy to difficult.

At a fixed distance, students are given groundstroke learning starting from behind the baseline, so that students are required to be able to feel how to hit the ball over the net and produce a good and accurate shot, from a hitting distance that is farther from the net than the gradual hitting distance.

At the gradual hitting distance, students are supposed to hit groundstroke with the hitting distance starting from the service line which is gradually extended to the baseline position. So that students can more easily feel the reflection of the ball against the racket and are expected to produce good and accurate strokes, learning with gradual hitting distances will make it easier for students to learn strokes because the distance is closer to the net.

Based on the results of the data analysis, it shows that there is no difference between the fixed hitting distance and the gradual hitting distance of the groundstroke ability. Fixed or gradual can be a form of variation in hitting distances in training while still referring to the learning objectives to be achieved.

3. The influence between perceptions of good kinesthetic and perception of poor kinesthetic on the ability of tennis groundstroke

Learning techniques is inseparable from how an athlete is able to perform a training task with the correct movements. The correctness of the movement will affect the level of energy expenditure. If the athlete is wrong or is unable to make the right movements, energy is wasted. This condition will affect the results to be achieved.

The most important factor affecting the quality of athletes in carrying out exercise tasks correctly and effectively is kinesthetic perception. The high mastery ability of a tennis court player to perceive a function of human organs that is closely related to body movements and limbs both actively and passively.

These movements are related to the basic movements of tennis skills.

Students who have good kinesthetic perception will find it easier to do the motion tasks given in learning, with this ability, the type of exercise carried out will be able to provide faster results compared to those who have less kinesthetic perception.

Sugiyanto and Sudjarwo (1992: 213) [4] suggest that "Perception is the capture of the meaning of the cues received by the senses. The meaning of the word of the sign is called information, and the information captured by the senses is then processed in mental work to find or recognize information, reveal the collected information and make judgments about the information received."

The results of the data analysis show that there are differences between athletes who have good kinesthetic perception compared to those who have less kinesthetic perception, this is in accordance with the above theory that kinesthetic perception will show a person's ability to carry out motion tasks correctly, quickly, and effectively. The more the athlete has a good kinesthetic perception, the athlete will be able to conduct all types of training correctly and accurately according to the level of energy expenditure required.

4. There is no correlation between the learning approach and hitting distance on tennis groundstroke ability

The results showed that there was no interaction effect between the learning approach and the strike distance, this could be because theoretically the learning approach and the hitting distance were two complementary methods, meaning that any method used in each learning must be accompanied by a hitting distance model.

The blocked practice learning approach and the random practice learning approach in the form of easy exercises to difficult exercises will show more results if done using the hit distance drill method, which will later be applied the fixed hitting distance drill method and gradual hitting distance so that it is more varied and not boring. With this condition, the form of training can use the hit distance drill method which can be adjusted to existing conditions such as the ability of the athlete, the available facilities and the available training time.

5. There is no correlation between the learning approach and the kinesthetic perception of tennis groundstroke ability

The difference in students' kinesthetic perceptions is something that must be considered in every exercise. The two training methods both consider differences in individual abilities in carrying out the type of learning programmed. Thus the increase in the groundstroke ability of the two groups of kinesthetic perception occurs in both types of learning approaches.

6. There is no correlation between hitting distance and kinesthetic perception of tennis groundstroke ability

The results showed that there was no connection effect between hitting distance and kinesthetic perception, this could be due to the fact that the strike distance and kinesthetic perception are two complementary methods, meaning that any method used in each strike distance must be accompanied by kinesthetic perception.

7. There is correlation between learning approaches, hitting distance, and kinesthetic perceptions on tennis groundstroke

Overall, there is an interaction between the three variables of the training model, meaning that the learning outcomes of the tennis groundstroke ability are obtained due to regular exercise. The achievement of the groundstroke ability of the tennis court due to the application of the learning approach is directly influenced by the difference between the distance and the difference in the student's kinesthetic perception.

Conclusion

Based on the findings and discussion, it can be summarize that,

1. There is a significant difference between the blocked practice learning approach and the random practice learning approach on the groundstroke ability of tennis. The blocked practice learning approach is superior to the random practice learning approach

2. There is no significant difference between fixed hitting distance and gradual hitting distance on tennis groundstroke ability. Even though there was no difference in effect between the two, the hitting distance still seemed to be better in contributing to the learning outcomes of groundstroke abilities

3. There is a significant difference in the effect of good kinesthetic perception and poor kinesthetic perception on the groundstroke ability of tennis court. Good kinesthetic perception has better results than less kinesthetic perception

4. There is no correlation between learning approach and hitting distance on tennis groundstroke ability

5. There is no interaction between learning approach and kinesthetic perception of tennis groundstroke ability

6. There is no correlation between hitting distance and students' kinesthetic perceptions of tennis groundstroke ability

7. There is correlation between the learning approach, hitting distance, and kinesthetic perception of tennis groundstroke ability

a. The blocked practice learning approach with fixed hitting distance would be better if it was given to students who have good kinesthetic perception

b. The blocked practice learning approach with gradual hitting intervals would be better if given to students who have less kinesthetic perception

c. The random practice learning approach with a fixed distance would be better if it was given to students who have good kinesthetic perceptions

d. The random practice learning approach with gradual hitting distance would be better if it was given to students who had good kinesthetic perception.

Recommendation

Based on the conclusions and implications above, it can be suggested to trainers or physical education teachers to do as described below:

1. For trainers or PE teachers in schools that the blocked practice learning approach has a better effect on the achievement of learning outcomes for tennis groundstroke abilities, so that teachers or trainers are advised to prefer the blocked practice learning approach in the preparation of learning programs. This is especially helpful if the learning activities are brief

2. For physical education teachers, they are supposed to be able to consider differences in student kinesthetic perceptions in the implementation of learning. High kinesthetic perceptions are proven to be very influential on the achievement of learning outcomes of groundstroke abilities. Therefore, teachers or trainers are advised to make learning programs always emphasize differences in kinesthetic perceptions possessed by students, grouping study groups will make the exercise more effective, so that learning outcomes in the form of an increase in groundstroke ability will be realized

3. Fixed hitting distance or gradual hitting distance even though it does not differ in results but still has an influence on the achievement of groundstroke ability results. For this reason, the teacher or trainer is advised that in the preparation of the learning program arrange the right hitting distance.

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