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The Effect of Pair Training on the Underhand Passing Ability of Students at SMA Negeri 5 Palopo

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Abstract

This study was motivated by the low underhand passing skills of volleyball extracurricular students at SMA Negeri 5 Palopo, as evident from the unsatisfactory results of inter-school tournaments. The purpose of this study was to determine the effect of paired training on students' underhand passing skills. This study used an experimental method with a one-group pretest-posttest design. The research population consisted of all 30 students participating in the volleyball extracurricular activity, with a sample of 15 students selected using purposive sampling. The research instrument used a passing skill test with a scoring system based on ball direction accuracy. The treatment consisted of a paired training program conducted over 16 sessions with a training frequency of three times per week. Data analysis techniques included descriptive analysis, normality test, homogeneity test, and hypothesis testing using a paired sample t-test at a significance level of $\alpha = 0.05$. The results showed that paired practice had a significant effect on improving students' underhand passing skills. The average pretest score of 12.60 increased to 21.00 on the posttest, with an increase of 8.40 points. The hypothesis test results obtained a t-count value of 14.000 > t-table 2.145 and a significance value of 0.000 < 0.05. The discussion revealed that the effectiveness of paired practice was due to direct feedback, repeated technical corrections, and the creation of an interactive and collaborative learning environment. The conclusion of this study is that there is a significant effect of paired practice on improving the underhand passing skills of students at SMA Negeri 5 Palopo. Paired practice is recommended as an alternative method in teaching basic volleyball skills at the high school level.

Keyword: Partner drills; underhand passing skills; volleyball

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Introduction

Volleyball is a team sport that is popular and widely played by people of all ages, from children to adults. Because volleyball is an enjoyable sport that only requires 12 players, a net, a ball, and an open court, it can be easily played almost anywhere (Gutema, 2017). Volleyball is a game played by two teams, each consisting of six players (Devit & Yulmiando, 2023). The sport has several basic rules that must be followed to ensure the game runs smoothly and fairly. Each team consists of six players, divided into two sections three players in the front row (near the net) and three players in the back row. The main objective of each team is to score points by sending the ball into the opponent's area in such a way that the opposing team is unable to return it properly (Nugraha & Yuliawan, 2021).

The game involves sending the ball over a net or rope into the opponent's area. The term "volleying" means to play the ball in the air before it touches the ground. Volleyball is based on two key principles: technical and psychological. Psychologically, players must play with enthusiasm, joy, and maintain good teamwork (Pelamonia & Firnanda, 2021). The rally point system is used, where every dead ball results in a point. If one team reaches 25 points with a two-point lead, that team wins the set. If both teams reach 24-24, play continues until one team achieves a two-point advantage (Siregar et al., 2021). Each team is allowed three touches to return the ball (excluding a block). The team that wins a rally earns a point, gains the right to serve, and rotates one position clockwise (Siregar et al., 2021).

Mastery of basic techniques plays a crucial role in determining whether a team wins or loses, alongside physical and mental condition. One of the fundamental techniques in volleyball is passing (Harahap, 2022). Passing in volleyball is the effort made by a player to pass the ball to a teammate using either an overhead pass (overhand pass) or an underhand pass (forearm pass). An underhand pass is typically used when the incoming ball is low, falling in front of or beside the body from waist level downwards (Susanto et al., 2021). The underhand pass is a fundamental technique that must be mastered by every player, as it is essential for receiving serves and passing the ball to the setter (Sehabudin & Mustaqim, 2023).

Good underhand passing ability enables players to control the ball accurately and deliver precise passes to teammates, serving as a foundation for developing other volleyball techniques such as serving, hitting, and attacking (Aryanto et al., 2023). The technique involves specific movements including hand positioning, foot stance, point of contact on the body (between the wrists and elbows), and the ball's trajectory (Rafika et al., 2023). Underhand passing is performed when the ball is below shoulder height, using both forearms with the wrists held tightly together (Sahabuddin et al., 2020). Its main functions are to receive the opponent's serve, pass to a teammate, and defend against attacks or smashes from the opposing team.

Partner training is an instructional method where players face each other and perform underhand passing drills together. The initial position involves standing opposite one another, then repeatedly executing underhand passes while ensuring the ball maintains a stable direction. This training should follow a well-designed program to be structured and organized. Key aspects include improving movement efficiency, concentration, and body coordination, including arm, body, and leg movements (Hadi & Sudijandoko, 2022). Partner training has specific objectives, such as strengthening teamwork, communication, and coordination

between players. Through this method, players can support each other, enhance technical skills, and build mutual trust.

By practicing together, they learn to overcome individual weaknesses, correct mistakes, and improve overall performance. Partner and individual drills are types of training designed to enhance students' basic technical skills, especially at a young age. These exercises involve repetitive movement patterns that should be well-oriented toward developing fundamental movement skills. As the intensity of movements increases, these exercises help build proper motor habits and body coordination, forming a solid foundation for further skill development (Jayanti & Nasuka, 2021). Partner passing drills are particularly useful for training passing accuracy and improving a player's alertness in receiving or controlling the ball (Tanzania et al., 2023).

Based on observations conducted with the person in charge of the volleyball extracurricular program at SMA Negeri 5 Palopo, it was found that students have not shown optimal performance over the past two years. This is evident from their results in recent events, such as the Kapolres Cup inter-school tournament and the UMPalopo Cup 2024, where the team's performance was below expectations. This issue is influenced by a lack of training consistency, with several scheduled sessions not being regularly conducted. Additionally, many students still struggle with basic techniques, particularly underhand passing. When attempting to receive the ball, they often misdirect it or fail to control its direction properly.

Limited skill level in this technique, especially among students not yet accustomed to it, contributes to these difficulties. Furthermore, when students lack focus during play, controlling the ball becomes even more challenging, leading to frequent errors. Through observations of extracurricular volleyball training at SMA Negeri 5 Palopo, it is clear that basic underhand passing is the most significant technical problem among students. Therefore, to improve the quality of their passing technique, a proposed solution is the implementation of partner-based training methods. This approach is seen as supportive and effective for enhancing underhand passing skills and elevating overall performance.

The problem statement of this research is whether there is an effect of partner training on underhand passing in volleyball. The objective is to determine whether partner training influences the ability to perform underhand passing. This research is supported by previous studies highlighting the positive impact of partner-based training methods on improving fundamental volleyball skills. (Ummah et al., 2019) stated that partner training has an effect on underhand passing ability among athletes of the Brojomusti Club in Pontianak. However, unlike previous studies, this research focuses more specifically on improving underhand passing skills of extracurricular volleyball students at SMA Negeri 5 Palopo through partner training exercises.

This study presents a novelty by specifically examining the effect of partner training methods on underhand passing ability among high school students an area that has been rarely explored, especially within the context of SMA Negeri 5 Palopo. Most previous studies have focused primarily on individual or classical training methods in teaching basic volleyball techniques, often neglecting the social and interactive dimensions of motor skill learning. The partner training approach applied in this research goes beyond technical development. It emphasizes collaboration, communication, and peer feedback, making it a more holistic

method aimed at enhancing learning effectiveness. Therefore, this study offers a new contribution to the development of more collaborative, contextual, and practical physical education strategies, particularly in improving basic volleyball skills specifically underhand passing at the senior high school level.

Methods

This study used a quantitative approach with a one-group pretest-posttest experimental design. This design was chosen to measure the effect of paired practice on students' underhand passing skills by comparing the results before and after the treatment in the same group (Syahrizal & Jailani, 2023). The population in this study consisted of all 30 students of SMA Negeri 5 Palopo who participated in volleyball extracurricular activities. The sampling technique used purposive sampling with the following inclusion criteria: students who actively participated in volleyball extracurricular activities, attended every training session regularly, and were willing to participate in the entire research process. Based on these criteria, a sample of 15 students was obtained.

The instrument used in this study was a underhand passing skill test in volleyball. The test procedure referred to the guidelines developed by (Nugroho & Indahwati, 2023) with a scoring system based on the accuracy of the ball direction. The scoring was as follows: 3 points for passes directed to the right and left front corners of the net, 5 points for passes that successfully reached the target area at the back corners of the left and right sides of the court. Each student was given the opportunity to perform underhand passing 10 times, and the final score was calculated based on the accumulated points obtained. The implementation of the underhand passing technique in this study referred to the procedure proposed by (Afdi et al., 2019) with the following stages.

1. Start with both arms straight and close together. Place one hand on top of the other so that both thumbs are parallel and aligned.
2. When the ball is struck, the point of contact with the ball is between the wrist and elbow, just above the wrist. The ball is moved by straightening and swinging both arms forward.
3. The final position is with the body's center of gravity over the front foot, with the shoulders slightly raised. The ball is directed toward the target. The arm swing is performed horizontally, and the body position is below the ball with the shoulders facing the target.

This research was conducted in three main stages:

1. The preparatory stage involved conducting initial observations and coordinating with the volleyball extracurricular coach at SMA Negeri 5 Palopo, developing a paired training program consisting of 16 sessions, preparing research instruments and assessment sheets, and informing students about the research procedures.
2. The pretest implementation stage involves conducting an initial test of underhand passing skills before treatment is given. Treatment: Providing a 16-session paired training program with a training frequency of 3 times per week. Each training session lasted 90 minutes, with details as follows: warm-up (15 minutes), core training (60 minutes), and cool-down (15 minutes). Posttest conducting a final test of underhand passing skills after the entire treatment series was completed.

3. Final stage collecting and processing research data. Analyzing data using appropriate statistical techniques. Compiling research results reports.

The collected data were analyzed using SPSS software version 23. The data analysis techniques used included descriptive analysis, which was used to provide an overview of the research data, including calculations of the mean, standard deviation, range, minimum value, and maximum value of the pretest and posttest results. A normality test was conducted to determine whether the data was normally distributed. The test used the Shapiro-Wilk test with the following decision criteria: if the significance value (Sig.) > 0.05, the data was declared to be normally distributed; if the significance value < 0.05, the data was declared to be not normally distributed.

Homogeneity testing is conducted to determine whether the data variants are homogeneous. The test used Levene's test with the following criteria: if the significance value was > 0.05, the data was declared homogeneous. Hypothesis testing (t-test) used a paired sample t-test to determine the difference in means between the pretest and posttest and to determine the effect of paired exercises on students' underhand passing ability. Testing criteria: if the t_count > t table and the significance value (2-tailed) < 0.05, then the research hypothesis is accepted, which means that there is a significant effect of paired exercises on the underhand passing ability of students at SMA Negeri 5 Palopo.

Result

Descriptive analysis was conducted to provide an overview of the data on the underhand passing skills of students at Palopo State Senior High School 5 before (pretest) and after (posttest) being given treatment in the form of paired exercises. This analysis includes calculations of the sample size (N), mean, standard deviation, range, minimum value, and maximum value. The results of the descriptive analysis are presented in table 1.

Table 1. Results of the descriptive analysis of underhand passing ability

Statistics	Pretest	Posttest
N (Sample Size)	15	15
(*Mean*)	12,60	21,00
Standard Deviation	3,098	4,472
(*Range*)	9	12
Minimum Value	9	15
Maximum Value	18	27

Based on table 1, the descriptive analysis results show that in the pretest, the underhand passing ability of students at SMA Negeri 5 Palopo obtained an average score of 12.60 with a standard deviation of 3.098. The lowest score achieved by students was 9 and the highest was 18, with a score range of 9. Meanwhile, in the final test (posttest) after being given paired training for 16 meetings, the average score for underhand passing ability was 21.00 with a standard deviation of 4.472. The lowest score achieved by students was 15 and the highest was 27, with a score range of 12. These results show an increase in the average score for underhand passing skills of 8.40 points, from 12.60 on the pretest to 21.00 on the posttest.

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Normality tests were conducted to determine whether the research data were normally distributed. This test used the Shapiro-Wilk test with the help of SPSS version 23. The decision criterion was that if the significance value (Sig.) was > 0.05, the data were declared to be normally distributed. Conversely, if the significance value was < 0.05, the data were declared to be not normally distributed. The results of the normality test are presented in Table 2.

Table 2. Results of the normality test for underhand passing ability data

Variabel	Shapiro-Wilk	Sig.	α	Keterangan
Pretest Underhand Passing Ability	0,891	0,191	0,05	Normally distributed
Posttest of Underhand Passing Ability	0,918	0,341	0,05	Normally distributed

Based on table 2, the results of the normality test using the Shapiro-Wilk test show that the significance value for the lower passing ability pretest data is 0.191 with a Shapiro-Wilk value of 0.891. Because the significance value of 0.191 > 0.05, it can be concluded that the pretest data is normally distributed. For the posttest data on lower passing ability, a significance value of 0.341 was obtained with a Shapiro-Wilk value of 0.918. The significance value of 0.341 > 0.05 indicates that the posttest data is also normally distributed. With the assumption of normality fulfilled for both data sets, parametric statistical analysis can be continued.

A homogeneity test was conducted to determine whether the data had the same variance or were homogeneous. This test used Levene's test with the help of SPSS version 23. The decision criterion was that if the significance value was > 0.05, the data was declared homogeneous. The results of the homogeneity test are presented in Table 3.

Table 3. Results of the homogeneity test of the underhand passing ability data

Levene Statistic	df1	df2	Sig.	Description
1,432	1	28	0,247	Homogeneous

Based on table 3, the results of the homogeneity test using Levene's test show a Levene statistic value of 1.432 with degrees of freedom (df1 = 1 and df2 = 28) and a significance value of 0.247. Since the significance value of 0.247 > 0.05, it can be concluded that the pretest and posttest data on underhand passing ability come from a population with homogeneous variance. Thus, the assumption of homogeneity is fulfilled for hypothesis testing. Hypothesis testing in this study used a paired sample t-test to determine the effect of paired training on the underhand passing ability of students at SMA Negeri 5 Palopo. This test was used to compare the mean pretest and posttest scores in the same group after treatment. The testing criteria are that if the t_count > t_table and the significance value (2-tailed) < 0.05, then the research hypothesis is accepted, which means that there is a significant effect. The results of the hypothesis testing are presented in table 4.

Tabel 4. Results of the paired sample t-test for underhand passing ability

Variabel	N	Mean	Calculated t	Table t	Sig. (2-tailed)	Description

Pretest Passing Below	15	12,60	14,000	2,145*	0,000	Significant
Posttest Passing Below	15	21,00				

The t-table value for df = 14 (n-1) at a significance level of α = 0.05 (two-tailed test)

Based on table 4, the results of the paired sample t-test show that the calculated t-value is 14.000, while the t-table value with degrees of freedom (df) = 14 at a significance level of α = 0.05 is 2.145. Thus, the t-count value (14.000) > t-table (2.145). In addition, the significance value (2-tailed) obtained is 0.000, which is smaller than 0.05 (0.000 < 0.05). These results indicate that there is a significant difference between the average lower passing ability scores of students before and after being given paired training. The average pretest score for lower passing ability was 12.60, while the average posttest score increased to 21.00, with an increase of 8.40 points. Based on all the data analysis results that have been carried out, the research findings can be summarized as follows:

1. There was an increase in the average passing ability score of students at SMA Negeri 5 Palopo after being given paired training for 16 sessions, from 12.60 on the pretest to 21.00 on the posttest (an increase of 8.40 points).
2. The research data was normally distributed (Sig. pretest = 0.191 > 0.05; Sig. posttest = 0.341 > 0.05) and homogeneous (Sig. = 0.247 > 0.05), thus fulfilling the assumptions for parametric statistical testing.
3. The results of the hypothesis test using a paired sample t-test show that the t-count (14.000) > t-table (2.145) and the significance value 0.000 < 0.05. This proves that paired exercises have a significant effect on improving the underhand passing skills of students at SMA Negeri 5 Palopo.

Discussion

This study aims to examine the effect of paired training on the underhand passing skills of students at SMA Negeri 5 Palopo. The sample consisted of 15 students who participated in volleyball extracurricular activities and were given a treatment in the form of a paired training program for 16 sessions with a training frequency of three times per week. The results of the study indicate that paired training has a significant effect on improving underhand passing skills, as evidenced by an increase in the average score from 12.60 in the pretest to 21.00 in the posttest, with an increase of 8.40 points.

The results of the hypothesis test using a paired sample t-test also show that the t-count (14.000) > t-table (2.145) with a significance of 0.000 < 0.05, indicating that the research hypothesis is accepted. The findings of this study indicate that paired exercises are effective in improving students' underhand passing skills. This is in line with the opinion of (Hadi & Sudijandoko, 2022), who stated that paired exercises allow players to face each other and practice underhand passing together, thereby improving movement efficiency, concentration, and body coordination, including arm, body, and leg movements.

In the context of this study, students who practice in pairs can observe each other and correct each other's techniques, making the skill learning process faster and more effective. The paired practice applied in this study included various exercises, such as close-range underhand passing, adjusting passing power, and maintaining a stable body position when receiving the

ball. These exercises are in line with the recommendations (Budi, 2021) that systematic and structured paired underhand passing practice helps students become familiar with the movements required in the volleyball underhand passing test.

The combination of underhand passing drills with various variations allows students to develop arm muscle strength through repetitive passing movements. The results of this study are also supported by the findings (Ratimiasih, 2021) which prove that paired underhand passing drills significantly affect the accuracy of underhand passing in volleyball. Partnered drills encourage students to perform repeated passing with correct body posture according to the instructions learned, starting from the preparation phase, the execution phase, to the follow-through phase. These phases aim to develop good and correct underhand passing skills.

This study reinforces previous findings that paired underhand passing drills are more effective than individual training methods. (Jayanti & Nasuka, 2021) concluded in their study that paired underhand passing drills resulted in better accuracy than individual drills among female volleyball extracurricular participants. This is because in paired training, students receive direct feedback from their partners regarding the accuracy of the ball's direction, passing strength, and body position when performing movements. Another advantage of paired training is the creation of a more interactive and enjoyable training atmosphere.

Pair drills have the specific purpose of strengthening teamwork, communication, and coordination between two players. Through joint exercises, players can support each other, improve technical skills, and build mutual trust. In this study, an interactive training atmosphere was observed when students encouraged each other, corrected their partners' technical mistakes, and worked together to achieve predetermined passing targets. The findings of this study can be explained through the perspectives of motor learning theory and constructivist learning theory. From the perspective of motor learning theory, (Robbins et al., 2020) explain that effective motor learning depends not only on repetition of movements but also on the quality of social interaction during practice.

Verbal and nonverbal feedback from partners can be an important stimulus for correcting technical errors immediately. This was proven in this study, where students who received direct feedback from their partners were able to immediately correct their body position, reaction speed, and ball direction when performing underhand passes. From a constructivist learning theory perspective, (Sari & Yuliana, 2022) found that learning models that emphasize collaboration between students produce higher motor skill learning outcomes compared to one-way teaching. Paired exercises allow students to develop technical skills more meaningfully because they not only receive information but also build learning experiences through repeated practice with their partners.

This is in line with the principle of constructivism, which emphasizes the importance of active student involvement in building understanding through social experiences and reflective practices. (Saleem et al., 2021) also emphasize that peer-based learning helps students understand movement concepts concretely through direct observation and correction from their peers. In the practice of underhand passing, students can immediately adjust their body position, reaction speed, and ball direction based on feedback from their partner. This not only speeds up the learning process but also boosts students' confidence in performing the technique correctly.

The findings of this study have important implications in the context of physical education learning in high schools. (Irawan & Sudrajat, 2021) state that collaborative exercises can improve students' motor skills through the strengthening of meaningful social interactions during the learning process. In the context of physical education, paired exercises create a more active, communicative, and reflective learning environment, which is very effective for developing basic motor skills such as underhand passing in volleyball. (Wahyuni & Setiawan, 2024) in their latest research confirm that paired exercise strategies are effective in building motor skills and improving student learning outcomes in physical education.

The improvement in underhand passing ability test results conducted before and after the treatment in this study proves that students who participated in paired exercises showed increased accuracy, faster reaction times, and more stable techniques in performing underhand passes. Physical education teachers can integrate the paired practice method into their regular teaching strategies, as this method has been proven to significantly improve learning outcomes. The pair-based approach can be a contextual, enjoyable, and effective learning alternative for developing students' sports skills.

In addition, this method also supports the development of students' affective and social aspects, such as cooperation, communication, and empathy, which are important goals in holistic physical education. The success of paired exercises in improving students' underhand passing skills in this study cannot be separated from several supporting factors. First, the training program was designed systematically and structured over 16 sessions with a frequency of three times per week, allowing for a gradual process of adaptation and skill improvement. Second, the availability of adequate facilities and equipment at SMA Negeri 5 Palopo, such as a volleyball court, balls, and nets, supported the smooth implementation of the training.

Third, the motivation and enthusiasm of students in participating in the entire series of exercises demonstrates a high level of commitment to improving their abilities. Another factor that is no less important is the role of extracurricular coaches who accompany and provide guidance during the training process. This guidance ensures that each pair of students performs the training with the correct techniques and in accordance with the designed program. This is in line with (Shafee et al., 2019) opinion, which emphasizes the importance of the role of coaches or teachers in ensuring the quality of training implementation to achieve optimal results.

Although this study provides empirical evidence of the effectiveness of paired exercises in improving underhand passing skills, there are several limitations that need to be acknowledged. The one-group pretest-posttest design without a control group did not allow researchers to control for external factors that may have influenced the results, such as student motivation, physical activity outside the exercise program, or other environmental factors. Future research should use an experimental design with a control group, involve a larger sample, and extend the duration of the study to observe long-term effects. In addition, further research could compare the effectiveness of paired exercises with other training methods, such as wall exercises or exercises with aids, to find the most effective method for improving underhand passing skills. Based on the discussion of the research results, it can be concluded that paired training is proven to be effective in improving the underhand passing skills of students at State Senior High School 5 Palopo.

This effectiveness is due to several factors, including direct feedback from partners, the creation of an interactive and enjoyable training atmosphere, opportunities for repeated practice with immediate correction, and the strengthening of cooperation and communication between students. These findings reinforce motor learning theory, which emphasizes the importance of feedback and social interaction in learning motor skills, as well as constructivist theory, which emphasizes the active role of students in building learning experiences through collaboration with peers. Thus, paired practice can be recommended as an effective method for teaching underhand passing skills in high school volleyball.

Conclusion

Based on the results of research and data analysis conducted on the effect of paired training on the underhand passing skills of students at SMA Negeri 5 Palopo, it can be concluded that there is a significant effect of paired training on improving the underhand passing skills of students at SMA Negeri 5 Palopo. This is evidenced by the results of hypothesis testing using a paired sample t-test, which shows a t-value of 14.000, greater than the t-table value of 2.145 (14.000 > 2.145) with a significance value of 0.000 < 0.05. There was an increase in the underhand passing ability of students after participating in a 16-session paired training program.

This is demonstrated by an increase in the average score from 12.60 in the pretest to 21.00 in the posttest, with a difference of 8.40 points. Pair practice has proven to be effective as a method for learning underhand passing skills in volleyball because this method allows students to give direct feedback to their partners, correct technical errors directly and repeatedly, create an interactive, communicative, and enjoyable learning environment, build cooperation, coordination, and mutual trust among students, and develop motor skills through repeated practice with meaningful social support.

Based on the research conclusions, there are several implications that can be drawn. The theoretical implications of this study reinforce motor learning theory, which emphasizes the importance of feedback and social interaction in learning motor skills, as well as constructivist theory, which emphasizes the active role of students in building learning experiences through collaboration with peers. The practical implications for physical education teachers are that paired exercises can be used as an effective alternative learning method to improve underhand passing skills in volleyball at school. For extracurricular coaches, this method can be applied continuously in routine training programs to develop students' basic volleyball skills. For students, paired exercises provide a more meaningful learning experience because they involve social interaction and cooperation with friends.

Author's Declaration

The author declares that this article is an original work that has not been published in any scientific journal, either in print or digital form, and is not currently under submission elsewhere. All forms of citations and references have been included in accordance with applicable scientific standards. The author expresses gratitude to all parties who have provided support, guidance, and motivation throughout the process of writing this article.

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