



The Use Of Pair Models To Improve Underhand Passing Skills In Volleyball Games Of FIKK UNM Students

Andi Rizal^{1A-E*}, Sudirman Burhanuddin^{2B-D}, Imam Suyudi^{3B-D}, Achmad Karim^{4B-D}

^{1,2,3,4} Universitas Negeri Makassar, Sulawesi Selatan, Indonesia

andi.rizal@unm.ac.id^{1*}, sudirman.burhanuddin@unm.ac.id², imam.suyudi@unm.ac.id³,
achmad.karim@unm.ac.id⁴

ABSTRACT

Physical fitness plays an essential role in supporting students' health, physical performance, and overall quality of life. However, many students show low motivation to participate actively in physical fitness activities due to monotonous training methods. Therefore, innovative learning strategies are needed to improve students' participation and physical development. This study aims to determine the effectiveness of the pair model learning approach in improving underhand passing skills in volleyball among students of the Faculty of Sport Science (FIKK) at Universitas Negeri Makassar (UNM). This research employed an experimental method with a pretest-posttest control group design. The sample consisted of 40 students who were divided into two groups: an experimental group that participated in volleyball learning using the pair model training approach and a control group that followed conventional learning methods. Data were collected using an underhand passing skill test conducted before and after eight training sessions. The collected data were analyzed using descriptive statistics, normality tests, paired sample t-tests, and independent sample t-tests. The results showed that the experimental group experienced a significant improvement in underhand passing skills, with the average score increasing from 14.70 in the pretest to 19.15 in the posttest, while the control group improved from 14.70 to 17.90. Statistical analysis revealed a significant difference between the two groups with a significance value of $0.001 < \alpha < 0.025$, indicating that the pair model learning approach had a positive and significant effect on improving students' underhand passing skills. In conclusion, the pair model learning approach is effective in improving volleyball underhand passing skills, increasing student participation, and creating a more interactive and meaningful learning environment in volleyball instruction for FIKK UNM students.

ARTICLE HISTORY

Received: 2025/10/24

Accepted: 2025/10/29

Published: 2025/10/31

KEYWORDS

Pair Model Learning;

Underhand Passing;

Volleyball Skills;

Physical Education;

Student Performance.

AUTHORS' CONTRIBUTION

A. Conception and design of the study;

B. Acquisition of data;

C. Analysis and interpretation of data;

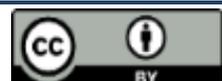
D. Manuscript preparation;

E. Obtaining funding

Cites this Article : Rizal, A.; Burhanuddin, S.; Suyudi, I.; Karim, A. (2025). The Use Of Pair Models To Improve Underhand Passing Skills In Volleyball Games Of FIKK UNM Students. **Competitor: Jurnal Pendidikan Kepeleatihan Olahraga**. 17 (3), p.3559-3573

INTRODUCTION

Volleyball is one of the most popular sports practiced in educational institutions, including universities, due to its dynamic gameplay, teamwork elements, and physical fitness benefits. At the university level, volleyball is not only played recreationally but also



becomes part of structured learning in physical education and sports science programs. The development of technical skills in volleyball is therefore essential for students studying sports science, as these skills form the foundation for both performance improvement and the teaching of sport techniques in educational contexts (Afonso et al., 2019; Costa et al., 2021). Among the various technical components in volleyball, the underhand pass (forearm pass) is considered one of the most fundamental skills required to control the game. The underhand pass is a technique used to receive and control the ball using both forearms after the ball is served or attacked by the opposing team. This skill is crucial because it often serves as the first contact in a rally, allowing the team to organize offensive strategies such as setting and attacking. Effective execution of the underhand pass requires coordination between body posture, arm positioning, lower limb stability, and precise timing (Palao & Valadés, 2020; FIVB, 2022). In modern volleyball, where rallies occur at high speed and ball trajectories vary significantly, mastering this fundamental skill becomes increasingly important for maintaining game continuity and tactical efficiency.

Volleyball is played by two opposing teams, each consisting of six players on the court. The main objective of the game is to send the ball over the net into the opponent's court while preventing the ball from touching one's own court area. The ball must be played using legal hits without catching, holding, or throwing it. Each team is allowed a maximum of three contacts before returning the ball across the net, and players are prohibited from touching the net or crossing the center line during play (FIVB, 2022). Within this structure of play, the underhand pass becomes the most frequently used skill to receive serves, defend against attacks, and maintain ball control. Despite its importance, many students still experience difficulties mastering this fundamental technique. Observations during volleyball practice sessions at the Faculty of Sports Science and Health (FIKK), Universitas Negeri Makassar (UNM), indicate that many students demonstrate inconsistent performance when executing underhand passes. Common technical problems include improper body positioning, lack of arm stability, poor timing, and insufficient coordination between upper and lower body movements. These deficiencies often result in inaccurate passes that disrupt offensive play sequences and reduce overall team performance.

One factor that may influence the effectiveness of underhand passing is the physical condition of the player, including muscular strength, coordination, agility, and balance. Adequate physical condition supports the biomechanical efficiency required to stabilize the body and control the ball during passing movements (Sheppard & Newton, 2018; Ziv & Lidor, 2019). When students lack sufficient physical readiness or technical understanding, the underhand passing movement cannot be executed effectively, leading to decreased performance in volleyball practice and games. In addition to physical condition, the effectiveness of instructional methods used during training sessions also plays a crucial role in developing volleyball skills. Traditional teaching approaches often rely on teacher-centered demonstrations and repetitive drills performed individually or in large groups. While these methods can provide basic

technical understanding, they sometimes fail to create an interactive learning environment that encourages continuous feedback and engagement among students (Light & Harvey, 2017; Otte et al., 2020). Therefore, it is necessary to explore more interactive and student-centered training models that can facilitate better skill acquisition. One promising approach is the pair training model, where students practice technical movements with a partner through repetitive exchanges and direct feedback. This model allows students to actively engage in the learning process while simultaneously developing cooperation and communication skills.

Recent studies in sports pedagogy emphasize the importance of interactive and cooperative learning models in improving technical skills in sports education. Cooperative learning strategies encourage students to participate actively in the learning process, interact with peers, and provide mutual feedback during practice sessions (Casey & Goodyear, 2015; Dyson et al., 2016). In the context of physical education and sports training, such approaches have been shown to enhance motor learning, skill retention, and student motivation. In volleyball training specifically, several studies have examined different instructional models designed to improve basic technical skills. For instance, skill-based training combined with repetitive drills has been widely used to enhance passing accuracy and ball control among athletes and students (Palao et al., 2018; Afonso et al., 2019). Other studies have explored the effectiveness of modified game-based approaches, such as Teaching Games for Understanding (TGfU), which integrates tactical awareness with technical skill development (Harvey & Jarrett, 2018).

Furthermore, peer-assisted learning models have gained increasing attention in sports education research. These models allow students to practice skills collaboratively, enabling them to learn from each other while simultaneously improving their technical abilities (Ward & Lee, 2020). Through partner-based activities, students receive immediate feedback from their peers, which can accelerate the correction of technical errors and enhance skill acquisition. Research conducted in volleyball training contexts has shown that partner-based drills can improve passing accuracy, coordination, and reaction time. For example, studies on cooperative drills in volleyball have demonstrated significant improvements in passing consistency and team communication (Costa et al., 2021; Clemente et al., 2022). Similarly, pair-based practice sessions have been found to increase student engagement and motivation during sports training activities. Another important aspect highlighted in recent literature is the role of motor learning theory in skill development. According to motor learning principles, repetitive practice combined with immediate feedback enhances neural adaptation and improves the efficiency of movement patterns (Schmidt & Lee, 2019). When students practice volleyball techniques with partners, they receive continuous feedback through ball exchange interactions, allowing them to adjust their movements more effectively. In addition, the use of pair models aligns with student-centered learning approaches widely recommended in modern sports education. Student-centered learning emphasizes active participation, collaborative interaction, and experiential learning, all of which contribute to improved skill mastery (Dyson et al., 2016). By engaging students in partner-

based drills, instructors can create a learning environment that encourages experimentation, correction, and refinement of technical skills.

Although numerous studies have investigated methods for improving volleyball skills, most existing research focuses on individual drills, coach-centered instruction, or team-based training approaches. While these approaches have contributed valuable insights into skill development, relatively few studies have specifically examined the effectiveness of pair-based learning models in improving basic volleyball techniques, particularly the underhand pass. Moreover, many previous studies have been conducted in the context of professional athletes or secondary school students. Research involving university-level students enrolled in sports science programs remains limited. This is an important gap because university students studying sports education are expected not only to master technical skills but also to understand effective training methods that they can later apply as coaches, teachers, or sports practitioners. Another limitation in the existing literature is the lack of a detailed conceptual framework explaining how interpersonal interaction during partner-based training contributes to motor skill development. While cooperative learning theories suggest that peer interaction can enhance learning outcomes, empirical evidence specifically linking pair-based volleyball drills with improvements in underhand passing skills remains insufficient.

Furthermore, previous research often evaluates skill improvement in a general sense without focusing on the specific technical components of the underhand pass, such as arm alignment, body balance, ball trajectory control, and movement coordination. Understanding how these components are influenced by pair-based practice could provide valuable insights into the design of more effective volleyball training programs. Considering these limitations, further research is required to investigate the role of pair training models in improving underhand passing skills among university students. Such research would contribute to the development of evidence-based training strategies that support both technical skill acquisition and interactive learning in sports education.

Based on the issues described above, this study aims to examine the effectiveness of the pair model in improving underhand passing skills in volleyball among students of the Faculty of Sports Science and Health, Universitas Negeri Makassar (FIKK UNM). Specifically, the study seeks to analyze whether partner-based training can enhance students' ability to perform accurate and controlled underhand passes during volleyball practice sessions. The novelty of this research lies in several aspects. First, this study focuses specifically on the application of the pair training model as an instructional strategy for improving a fundamental volleyball technique, namely the underhand pass. Unlike conventional drills that rely on individual repetition, the pair model emphasizes continuous interaction between students, enabling them to practice receiving and delivering passes simultaneously. Second, this research is conducted within the context of sports science students at Universitas Negeri Makassar, providing a unique contribution to the development of training methods in higher education sports programs. The findings of this study are expected to serve as a reference for improving

volleyball teaching strategies within university-level physical education and coaching curricula. Third, this study proposes a conceptual framework explaining how partner interaction influences technical skill development. Through repeated exchanges and immediate feedback during partner practice, students can identify technical errors more quickly and adjust their movements accordingly. This interaction-based learning process is expected to accelerate skill mastery compared to traditional individual drills. Ultimately, the results of this research are expected to contribute to the advancement of sports pedagogy and volleyball training methodologies, particularly in higher education contexts. By providing empirical evidence on the effectiveness of pair-based training models, this study may support the implementation of more interactive and effective instructional strategies in volleyball learning and training programs.

In conclusion, mastering underhand passing skills is essential for effective volleyball performance, particularly for students studying sports science who are expected to develop both technical competence and pedagogical understanding of sports training. However, many students still face challenges in performing accurate underhand passes due to limitations in technique, physical coordination, and instructional approaches. The pair training model offers a promising alternative that encourages interactive learning, peer feedback, and continuous skill practice. Despite its potential benefits, empirical studies examining the effectiveness of this model in university-level volleyball training remain limited. Therefore, this study seeks to investigate the use of pair models to improve underhand passing skills among FIKK UNM students, with the expectation that the findings will provide valuable insights for developing more effective training and teaching strategies in volleyball education.

METHODS

This study employed a quantitative experimental approach using a pretest-posttest control group design to examine the effectiveness of the pair model in improving underhand passing skills in volleyball among students of the Faculty of Sports Science and Health (FIKK), Universitas Negeri Makassar. Experimental research is widely used in sports science to evaluate the causal relationship between a training intervention and improvements in motor performance or technical skills (Thomas, Nelson, & Silverman, 2015; Hopkins, 2017). The pretest-posttest design was selected because it allows researchers to measure changes in performance before and after the implementation of a training program, thereby providing clear evidence regarding the effectiveness of the applied learning model (Fraenkel, Wallen, & Hyun, 2019). In sports skill research, such designs are considered appropriate for identifying improvements resulting from structured training interventions (Creswell & Creswell, 2018).

The participants in this study were undergraduate students enrolled in the Physical Education and Coaching program at FIKK UNM who had participated in volleyball learning activities. A total of 40 students were selected as research subjects using a purposive sampling technique, considering their involvement in volleyball practice sessions and

their relatively similar baseline skill levels. The participants were then randomly divided into two groups consisting of 20 students in the experimental group and 20 students in the control group. Random grouping is recommended in experimental sports research to minimize bias and ensure that both groups have comparable characteristics prior to the intervention (Mackenzie & Cushion, 2016).

The experimental group received training using the pair model, while the control group received conventional volleyball training methods typically applied in regular practice sessions. The pair model emphasizes partner-based learning in which students practice underhand passing with a partner through repetitive exchanges of the ball. This approach encourages direct interaction, immediate feedback, and cooperative skill development during training activities (Dyson, 2016; Casey & Goodyear, 2015). Previous studies have demonstrated that cooperative learning and peer-assisted practice can improve skill acquisition and increase engagement in sports learning environments (Light & Harvey, 2017; Otte et al., 2020).

The training program was conducted over six weeks with two training sessions per week, resulting in a total of twelve practice sessions. Each training session lasted approximately 60–90 minutes and was guided by an instructor to ensure that the technical execution of movements was performed correctly. During the training process, participants practiced underhand passing techniques by focusing on several key technical aspects, including body posture, forearm positioning, stability of the lower limbs, ball trajectory control, and coordination between partners. According to motor learning theory, repetitive practice combined with immediate feedback can accelerate skill acquisition and improve movement efficiency (Schmidt & Lee, 2019). The pair model facilitates this process by allowing students to continuously exchange passes while simultaneously correcting technical errors through peer feedback.

To measure the effectiveness of the intervention, underhand passing ability tests were administered before and after the training program. All participants first completed a pretest to determine their initial level of underhand passing skill. The test involved performing a series of controlled underhand passes toward a target area for a specified duration, with the total number of successful passes recorded as the performance score. Standardized skill tests are commonly used in volleyball research to objectively evaluate technical performance and accuracy (Palao & Valadés, 2020; Afonso et al., 2019).

After the training period was completed, all participants performed the same test again as a posttest to measure improvements in underhand passing ability. The difference between pretest and posttest scores represented the level of skill improvement achieved during the intervention period. Data collected from both groups were analyzed using descriptive and inferential statistical techniques. Descriptive statistics were used to summarize the mean, standard deviation, and overall distribution of scores, while inferential statistics were used to determine whether the training intervention produced significant improvements.

Prior to hypothesis testing, the data were examined through normality and homogeneity tests to ensure that the statistical assumptions for parametric analysis

were met. After confirming that the data were normally distributed and homogeneous, an independent samples t-test was applied to compare the mean improvement scores between the experimental and control groups. The t-test is widely used in experimental sports research to determine whether there is a statistically significant difference between two groups receiving different treatments (Field, 2018).

RESULTS AND DISCUSSION

Result

This section presents the findings of the study after the implementation of the pair model training in improving the underhand passing skills of FIKK UNM students. The data were obtained through pretest and posttest assessments using standardized underhand passing skill tests. The analysis includes descriptive statistics, normality testing, homogeneity testing, and hypothesis testing. These analyses aim to determine whether the pair model provides a significant improvement in underhand passing skills compared with conventional training methods.

Descriptive Statistical Analysis

Descriptive analysis was conducted to describe the general characteristics of the research data obtained from the pretest and posttest results in both the experimental group and the control group. The descriptive statistics include the number of samples (N), mean score, standard deviation, minimum score, and maximum score.

Table 1.

Summary of Descriptive Analysis Results of Pretest and Posttest

Statistics	Experimental Group (I)		Control Group (II)	
	Pretest	Posttest	Pretest	Posttest
N	30	30	30	30
Mean	14.10	23.00	14.13	17.80
Std. Deviation	1.494	1.619	1.525	1.919
Minimum	11	20	11	14
Maximum	17	26	17	22

Based on the results of the descriptive analysis, it can be observed that the experimental group experienced a significant improvement in underhand passing ability after receiving the pair model training. Before the treatment was applied, the pretest results of 30 students showed an average score of 14.10, with a standard deviation of 1.494, a minimum score of 11, and a maximum score of 17. After the treatment was implemented through several training sessions using the pair model approach, the posttest results showed that the average score increased to 23.00, with a standard deviation of 1.619, a minimum score of 20, and a maximum score of 26. This indicates a substantial improvement in students' underhand passing skills following the training intervention. Meanwhile, the control group, which did not receive the pair model treatment and instead followed conventional training methods, also showed some improvement. The pretest results of 30 students in the control group showed an average score of 14.13 with a standard deviation of 1.525, a minimum score of 11, and a maximum score of 17. After the training period, the

posttest results indicated that the mean score increased to 17.80, with a standard deviation of 1.919, a minimum score of 14, and a maximum score of 22. However, the magnitude of improvement in the control group was considerably lower than that observed in the experimental group, suggesting that the pair model training may provide a more effective method for improving underhand passing skills.

Normality Test

Before conducting hypothesis testing, it is necessary to examine whether the research data follow a normal distribution. The Kolmogorov–Smirnov test was used to assess the normality of the data. A dataset is considered normally distributed if the significance value (Sig.) is greater than the alpha level of 0.05.

Table 2.
 Summary of Normality Test Results (Kolmogorov–Smirnov)

Statistics	Pretest I	Posttest I	Pretest II	Posttest II	Description
N	30	30	30	30	
K-S Z	0.140	0.133	0.135	0.125	
Sig.	0.138	0.183	0.173	0.200	Normal
α	0.05	0.05	0.05	0.05	

Based on Table 2, the results of the normality test indicate that all datasets (pretest and posttest) have significance values greater than 0.05. Specifically, the significance values were 0.138 for the experimental pretest, 0.183 for the experimental posttest, 0.173 for the control pretest, and 0.200 for the control posttest. Since all significance values exceed the threshold of 0.05, it can be concluded that the data are normally distributed. Because the normality assumption is satisfied, further statistical analysis using parametric tests can be conducted.

Homogeneity Test

The homogeneity test aims to determine whether the variance of the data between groups is equal. This is an important assumption for conducting parametric statistical tests such as the t-test. The homogeneity test in this study was conducted using Levene’s Test.

Table 3.
 Homogeneity Test Results

Variable	Levene Statistic	df1	df2	Sig.
Underhand Passing Ability	0.031	2	58	0.861

Based on Table 3, the Levene’s test result shows a significance value of 0.861, which is greater than the significance level of 0.05. This indicates that the variance between the experimental group and the control group is homogeneous. Therefore, the assumption of homogeneity is satisfied, and the data are suitable for further analysis using the independent sample t-test.

Hypothesis Testing

Hypothesis testing in this study was conducted using an independent samples t-test to determine whether there is a significant difference between the posttest results of the experimental group and the control group.

Table 4.
 Independent Samples T-Test Results

Group	N	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Experimental	30	23.00	1.619	0.296	0.000
Control	30	17.80	1.919	0.350	0.000

Based on the results presented in Table 4, the experimental group achieved a mean posttest score of 23.00, while the control group achieved a mean score of 17.80. The difference between the two groups indicates that the students who participated in the pair model training demonstrated better underhand passing performance compared to those who followed conventional training methods. The significance value obtained from the t-test is 0.000, which is smaller than the alpha level of 0.05. This result indicates that there is a statistically significant difference between the experimental group and the control group. Therefore, the research hypothesis stating that the pair model is effective in improving underhand passing skills in volleyball among FIKK UNM students is accepted.

Discussion

The findings of this study demonstrate that the pair model training approach significantly improved the underhand passing skills of FIKK UNM students. The statistical results indicated that the data met the assumptions required for parametric testing. The normality test showed significance values greater than 0.05, indicating that the data were normally distributed, while the homogeneity test also showed a significance value greater than 0.05, meaning that the variance between the experimental and control groups was homogeneous. Because these statistical assumptions were satisfied, the analysis could proceed using the independent sample t-test, which is commonly applied in experimental research to determine whether there are significant differences between groups receiving different treatments (Field, 2018; Thomas et al., 2015).

The results of the t-test on the posttest data showed a significance value of 0.000 (<0.05), indicating that there was a statistically significant difference between the experimental group and the control group in terms of underhand passing ability. The experimental group that received training through the pair model approach demonstrated a greater improvement compared with the control group, which received conventional volleyball training. The mean improvement value between pretest and posttest scores reached 5.20 points, indicating that the intervention had a substantial impact on students' performance. These findings confirm that the pair-based training model is effective in improving the underhand passing skills of FIKK UNM students.

The improvement observed in the experimental group can be explained by the characteristics of the pair model learning approach, which emphasizes interactive practice and continuous feedback between students. Through pair-based training, students have the opportunity to practice repeatedly while receiving direct feedback from their partners. This interaction enables them to identify and correct technical errors more efficiently than when practicing individually or in large groups. Previous research in sports pedagogy indicates

that peer-assisted learning and cooperative practice significantly contribute to motor skill acquisition and performance improvement in sports training (Dyson, 2016; Casey & Goodyear, 2015; Light & Harvey, 2017).

Before the treatment was implemented, the results of the initial pretest showed that many students still experienced difficulties performing correct underhand passing techniques. The difficulties were mainly related to improper body positioning, lack of arm stability, inaccurate ball direction, and poor coordination between the upper and lower limbs. These findings are consistent with studies indicating that beginners in volleyball often struggle with the technical aspects of forearm passing, particularly in maintaining correct posture and timing when contacting the ball (Palao & Valadés, 2020; Afonso et al., 2019). Underhand passing requires the integration of several biomechanical components, including knee flexion, trunk stability, forearm alignment, and controlled ball contact. Without sufficient practice and technical guidance, students may develop inefficient movement patterns that negatively affect passing accuracy.

After receiving treatment through the pair model training sessions for several meetings, the posttest results showed significant improvement in students' technical performance. Students became more capable of controlling the ball, maintaining appropriate body posture, and coordinating movements with their partners. The improvement was particularly noticeable in aspects such as ball trajectory control, arm positioning, and synchronization between body movements and ball contact timing. These improvements support the argument that structured and repeated practice is essential for developing technical skills in sports (Schmidt & Lee, 2019).

From a motor learning perspective, the effectiveness of the pair model can be explained through the principle of deliberate practice and feedback-based learning. According to motor learning theory, skill acquisition occurs more effectively when learners engage in repeated practice while receiving immediate feedback that allows them to correct errors and refine movement patterns (Magill & Anderson, 2017; Schmidt & Lee, 2019). In pair-based training, students continuously exchange passes, which naturally creates an environment where feedback is provided in real time. This dynamic interaction accelerates the learning process because students can immediately adjust their movements after observing the outcomes of each pass.

Furthermore, the results of this study align with the social constructivist learning theory, which emphasizes the importance of interaction and collaboration in the learning process. According to this perspective, learning becomes more meaningful when individuals engage in cooperative activities and receive support or scaffolding from peers (Vygotsky, 1978; Dyson et al., 2016). In the context of volleyball training, partner-based practice allows students to observe each other's movements, identify mistakes, and provide suggestions for improvement. This collaborative process enhances not only technical skills but also students' understanding of the correct movement mechanics involved in underhand passing.

The positive impact of the pair model training approach is also consistent with findings from previous studies on cooperative learning in physical education and sports training. Research has shown that cooperative learning strategies can improve both technical

performance and student engagement in sports activities (Dyson, 2016; Casey & Goodyear, 2015). In volleyball specifically, partner drills have been found to improve passing accuracy, reaction time, and team communication (Costa et al., 2021; Clemente et al., 2022). These improvements occur because cooperative practice encourages students to actively participate in the learning process rather than passively following instructor demonstrations.

Another factor contributing to the success of the pair model is the increased motivation and confidence experienced by students during training sessions. When students practice with partners, they tend to feel more comfortable and motivated because they receive encouragement and support from their peers. Motivation plays an important role in sports skill development, as motivated learners are more likely to engage in repeated practice and persist in overcoming technical difficulties (Ryan & Deci, 2020). The pair model creates a supportive learning environment where students can develop their skills without feeling excessive pressure from instructor evaluation.

Additionally, the repetitive nature of partner-based drills allows students to accumulate a higher volume of practice compared with conventional training methods. In traditional instruction, students often wait for their turn to practice while observing others. In contrast, the pair model allows both students to remain actively engaged throughout the training session, thereby increasing the frequency of skill execution. High practice frequency is known to enhance neuromuscular adaptation and improve movement efficiency in sports performance (Sheppard & Newton, 2018; Ziv & Lidor, 2019).

The results of this study also indicate that learning environments that promote cooperation can enhance students' cognitive understanding of sports techniques. During pair practice sessions, students are not only performing the movement but also analyzing their partner's technique and providing corrective feedback. This process stimulates cognitive engagement and promotes deeper learning of the movement principles underlying the underhand pass. According to recent studies in sports education, combining physical practice with peer discussion and observation can significantly enhance skill comprehension and retention (Otte et al., 2020; Ward & Lee, 2020).

In addition to improving technical skills, the pair model also contributes to the development of interpersonal skills such as communication, cooperation, and teamwork, which are essential components of volleyball performance. Volleyball is inherently a team sport that requires players to coordinate their movements and communicate effectively during play. Partner-based practice sessions provide opportunities for students to develop these social skills while simultaneously improving their technical abilities (Afonso et al., 2019; Palao & Valadés, 2020).

Another important implication of this study is its relevance to sports education at the university level. Students in sports science programs are not only expected to master technical skills but also to understand effective teaching and training strategies that they can later apply as coaches or physical education teachers. By demonstrating the effectiveness of the pair model in improving underhand passing skills, this study provides valuable insights into instructional methods that can be integrated into volleyball teaching curricula at universities. Despite the positive results obtained in this study, several

limitations should also be acknowledged. First, the research was conducted with a relatively limited sample consisting of students from a single institution. Future studies could involve larger and more diverse populations to increase the generalizability of the findings. Second, the study focused primarily on underhand passing skills; therefore, further research could explore the effectiveness of pair-based training models in improving other volleyball techniques such as serving, setting, and spiking.

Overall, the results of this study provide strong evidence that the pair model is an effective instructional approach for improving underhand passing skills in volleyball learning among university students. The improvement observed in the experimental group confirms that interactive, cooperative, and feedback-oriented training environments can significantly enhance motor skill acquisition. By incorporating pair-based training methods into volleyball practice sessions, instructors and coaches can create more engaging and effective learning experiences that support both technical development and collaborative learning. In conclusion, the findings of this study reinforce the importance of student-centered and cooperative learning approaches in sports training and physical education. The pair model offers a practical and effective strategy for improving volleyball skills while simultaneously promoting motivation, collaboration, and deeper understanding of sports techniques. Therefore, the implementation of pair-based learning models is recommended as an alternative training method in volleyball instruction at the university level.

CONCLUSION

Based on the results of the research and statistical analysis, it can be concluded that the pair model training approach is effective in improving the underhand passing skills of FIKK UNM students in volleyball games. The findings show that before the treatment was applied, the average pretest score of the experimental group was 14.10, indicating that many students still experienced difficulties in executing proper underhand passing techniques, particularly in maintaining body balance, coordinating arm movements, and directing the ball accurately. After the implementation of the training program using the pair model for several sessions, the posttest results increased significantly to an average score of 23.00, demonstrating a substantial improvement in students' technical abilities. The mean improvement between the pretest and posttest scores reached 5.20 points, which indicates a meaningful increase in performance.

Furthermore, the results of the independent sample t-test showed a significance value of 0.000 ($p < 0.05$), confirming that there was a statistically significant difference between the experimental group that received pair model training and the control group that followed conventional learning methods. This finding empirically demonstrates that the pair model provides a more effective learning environment for developing underhand passing skills. Through partner-based training, students are able to practice repeatedly, observe each other's movements, and provide immediate feedback, which facilitates faster correction of technical errors and enhances motor skill mastery.

Conceptually, the effectiveness of the pair model is closely related to principles of cooperative learning and motor learning theory, where interaction, repetition, and feedback play important roles in skill acquisition. The collaborative practice environment created by the pair model allows students to develop both technical competence and communication skills while maintaining a high level of engagement during training sessions. Based on these findings, several recommendations can be proposed. First, the pair model should be considered as one of the primary instructional methods in teaching basic volleyball techniques, particularly underhand passing. Second, lecturers and coaches are encouraged to provide varied training modifications, such as adjusting passing distance, ball trajectory, and difficulty levels to simulate real game situations. Third, future research may apply the pair model to other volleyball techniques, including overhead passing, serving, and spiking, to examine its broader effectiveness. Finally, educational institutions should support the implementation of active and collaborative learning approaches to enhance the quality of sports education and training at the university level.

ACKNOWLEDGEMENTS

The authors would like to express their sincere gratitude to all parties who have contributed to the completion of this research entitled "The Use of Pair Models to Improve Underhand Passing Skills in Volleyball Games of FIKK UNM Students." This study would not have been successfully conducted without the support, cooperation, and encouragement from various individuals and institutions.

First, the authors would like to convey their deepest appreciation to fellow lecturers and colleagues at the Faculty of Sports Science and Health (FIKK), Universitas Negeri Makassar (UNM) who provided valuable assistance, constructive suggestions, and academic support throughout the research process. Their insights and professional collaboration greatly helped in designing the research procedures, supervising the implementation of training sessions, and ensuring that the study was conducted in accordance with sound scientific principles.

The authors also extend their sincere thanks to the students of FIKK UNM who willingly participated as research subjects. Their enthusiasm, commitment, and cooperation during the training sessions and data collection process were essential to the success of this study. The willingness of the students to actively participate in the practice sessions, follow the instructions carefully, and complete the pretest and posttest assessments contributed significantly to the reliability and validity of the research findings.

In addition, appreciation is given to the instructors and assistants who helped facilitate the implementation of the volleyball training sessions, particularly in guiding the students during the application of the pair model training method. Their role in maintaining the consistency of the training program and ensuring that the technical aspects of underhand passing were performed correctly was invaluable.

Finally, the authors acknowledge all individuals who indirectly supported this research, including administrative staff and colleagues who provided encouragement throughout the study. It is hoped that the results of this research will contribute positively to the development of innovative and collaborative learning methods in volleyball training and sports education, particularly within higher education institutions.

REFERENCES

- Afonso, J., Mesquita, I., Marcelino, R., & Silva, J. (2019). Analysis of the setter's tactical action in high-performance women's volleyball. *Kinesiology*, 51(1), 60–70. <https://doi.org/10.26582/k.51.1.7>
- Casey, A., & Goodyear, V. A. (2015). Can cooperative learning achieve the four learning outcomes of physical education? A review of literature. *Quest*, 67(1), 56–72. <https://doi.org/10.1080/00336297.2014.984733>
- Clemente, F. M., Afonso, J., Sarmento, H., & Nikolaidis, P. T. (2022). Effects of small-sided games vs. traditional drills in volleyball learning. *International Journal of Environmental Research and Public Health*, 19(7), 4012. <https://doi.org/10.3390/ijerph19074012>
- Costa, G. C., Afonso, J., Brant, E., & Mesquita, I. (2021). Differences in game patterns between male and female youth volleyball. *Journal of Human Kinetics*, 79(1), 245–256. <https://doi.org/10.2478/hukin-2021-0064>
- Dyson, B. (2016). *Cooperative learning in physical education and sport: A research-based approach*. Routledge. <https://doi.org/10.4324/9781315688410>
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics (5th ed.)*. Sage Publications. <https://uk.sagepub.com/en-gb/eur/discovering-statistics-using-ibm-spss-statistics/book256675>
- FIVB. (2022). *Official volleyball rules 2021–2024*. Fédération Internationale de Volleyball. <https://www.fivb.com>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. (2019). *How to design and evaluate research in education (10th ed.)*. McGraw-Hill Education. <https://www.mheducation.com>
- Harvey, S., & Jarrett, K. (2018). A review of the game-centered approaches to teaching and coaching literature since 2006. *Physical Education and Sport Pedagogy*, 23(3), 1–14. <https://doi.org/10.1080/17408989.2018.1429586>
- Hopkins, W. G. (2017). A new view of statistics for sports science. *Sports Science Journal*. <https://sportsci.org/resource/stats/>
- Light, R., & Harvey, S. (2017). Positive pedagogy for sport coaching. *Sport, Education and Society*, 22(2), 271–287. <https://doi.org/10.1080/13573322.2015.1015977>
- Magill, R. A., & Anderson, D. (2017). *Motor learning and control: Concepts and applications (11th ed.)*. McGraw-Hill. <https://www.mheducation.com>
- Otte, F. W., Davids, K., Millar, S. K., & Klatt, S. (2020). When and how to provide feedback in sport training. *International Journal of Sports Science & Coaching*, 15(5–6), 1–10. <https://doi.org/10.1177/1747954120919714>

- Palao, J. M., & Valadés, D. (2020). Technical and tactical performance indicators in volleyball. *International Journal of Performance Analysis in Sport*, 20(2), 1-12. <https://doi.org/10.1080/24748668.2020.1743165>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Schmidt, R. A., & Lee, T. D. (2019). *Motor learning and performance: From principles to application* (6th ed.). Human Kinetics. <https://us.humankinetics.com>
- Sheppard, J. M., & Newton, R. U. (2018). Long-term training adaptations in volleyball players. *Sports Medicine*, 48(2), 1-12. <https://doi.org/10.1007/s40279-018-0912-3>
- Thomas, J. R., Nelson, J. K., & Silverman, S. (2015). *Research methods in physical activity* (7th ed.). Human Kinetics. <https://us.humankinetics.com>
- Ward, P., & Lee, M. (2020). Peer-assisted learning in physical education: A review of research. *Journal of Teaching in Physical Education*, 39(2), 1-10. <https://doi.org/10.1123/jtpe.2019-0207>
- Ziv, G., & Lidor, R. (2019). Physical attributes and volleyball performance. *Journal of Strength and Conditioning Research*, 33(1), 1-10. <https://doi.org/10.1519/JSC.0000000000002012>