

The effect of double triangle pass training on futsal passing accuracy in extracurricular school players

Deny Solehudin ^{ABCD}, Rahmat Rahmat ^{AD}

Physical Education, Health and Recreation, Al-Ihya Islamic University, Kuningan, INDONESIA.

Authors' Contributions: A - Study Design; B - Data Collection; C - Statistical Analysis; D - Manuscript Preparation; E - Funds Collection

Article Information:

Submitted: February 28, 2026; Accepted: March 29, 2026; Published: March 31, 2026

ABSTRACT

Problems: Accurate passing is crucial in futsal due to the limited space and fast tempo, essential for controlling the game and possession. Initial observations revealed inconsistent passing accuracy among school futsal extracurricular players during competitive matches. **Purpose:** This study aimed to test the effectiveness of the Double Triangle Pass drill, a method designed to simultaneously enhance accuracy, ball control, and teamwork to address this performance gap. **Methods:** This quantitative research used a One Group Pretest-Post-test Design. The sample consisted of 25 players from the futsal extracurricular program. The Double Triangle Pass intervention was administered over 10 treatment sessions, with each session lasting approximately 90 minutes. The data collection instrument was the 30-second wall rebound Passing and Stopping test. **Results:** The results showed a significant improvement in passing accuracy. The pretest mean score was 17.20, which increased to 24.28 in the post-test. The paired t-test yielded a significance value of $p = 0.001$ and an effect size of (Cohen's $d = 2.68$), confirming a significant practical effect of the drill. However, given the absence of a control group, these findings should be interpreted with caution regarding definitive causality. **Conclusion:** The Double Triangle Pass drill shows promising effectiveness in improving futsal passing accuracy within the studied population. This method is recommended for implementation in extracurricular programs, though future research with controlled designs is suggested.

Keywords: double triangle pass, passing accuracy, futsal, skill acquisition, motor learning, training intervention.

 <https://doi.org/10.24036/patriot.v%vi%i.1236>



Corresponding Author:

Deny Solehudin

Physical Education, Health and Recreation, Al-Ihya Islamic University, Kuningan, INDONESIA.

Email: denybadgeur@gmail.com

Introduction

Futsal has become one of the most popular and beloved sports across all levels of global society, including in Indonesia. The essence of futsal is similar to that of soccer, in that both involve two teams facing each other in a match (Setiawan & Sudarmono, 2021). Its high accessibility, with fields readily available in remote villages and hamlets, has encouraged massive participation across all age groups, particularly among students. This phenomenon is reflected in the numerous futsal tournaments regularly held, from the district level to the inter-school level. This high level of participation demonstrates its broad relevance for research in sports science, as improving fundamental skills can significantly impact the performance of athletes at various levels. Therefore, research focused on improving fundamental abilities in futsal has significant practical implications for this rapidly growing sports community.

Futsal is characterized by limited space and a fast tempo. The ability to move the ball efficiently, quickly, and efficiently between players is a crucial skill for optimally utilizing limited space. One of the skills in futsal is passing. Passing is a fundamental biomechanical and tactical skill in futsal that requires precise coordination of the lower extremities to transfer the ball accurately to a teammate. Because futsal is characterized by limited space and a fast tempo, accurate and optimally weighted passes are essential to ensure the ball moves quickly without compromising the receiver's control. Furthermore, passing accuracy relies heavily on cognitive elements such as visual attention and rapid decision-making under pressure. A poor pass can negate a team's positional advantage, whereas high-quality passing allows a team to dictate the tempo of the game, manipulate the opponent's defensive structure, and exploit open spaces (Fitrian, et al., 2023; Saputra et al., 2025).

Despite regular training, field observations of the extracurricular boys' futsal team at SMA Negeri 1 Kuningan revealed significant inconsistencies in passing accuracy. During the recent VIK tournament, preliminary observational data indicated that approximately 40% of attempted passes were unsuccessful or intercepted due to poor weighting and inaccuracy. This empirical gap suggests that current training methods may not be fully optimized to develop robust passing skills under match pressure, thus requiring a specific research intervention. Various studies have been conducted to examine the effectiveness of training methods in improving passing accuracy in soccer and futsal. Novrizal Priawan (2018) examined the effect of diamond and triangle passing training models on soccer passing accuracy in All Tridadi Soccer Association (PSST) players. The study concluded that the triangle passing training model had a more significant effect on soccer passing accuracy than the diamond model. Meanwhile, Hasbullah, et.al. (2014) also examined the effect of playing methods on learning outcomes in soccer passing using the inside of the foot, with results showing a significant effect of playing methods on passing accuracy. Both studies focused on the context of soccer, which has significant differences in field size, ball type, and tactical demands compared to futsal.

In the context of futsal, Habib Hafidhurriqi and Andri Wahyu Utomo (2022) conducted a study on the effect of the short passing diamond and short passing triangle training methods on improving the passing accuracy of futsal extracurricular participants at MAN 2 Kota Madiun. Their results showed that both training methods were equally effective in improving students' passing accuracy, with no significant differences in their effects. Furthermore, Dwiyanto. A (2011) conducted a descriptive study on the level of basic futsal technical skills of students participating in the futsal extracurricular at SMA Negeri 3 Klaten, which provided a general overview of the players' ability levels, but did not evaluate the effectiveness of specific training interventions. Although the existing literature has reviewed several passing training models in soccer and futsal, there is growing interest in training that integrates multiple skill aspects simultaneously. One relevant training method is the Double Triangle Pass drill. This drill is designed to simultaneously improve passing accuracy, ball control, off-the-ball movement, and teamwork. The drill involves a combination of one -two and third-person passes in small and large spaces, encouraging players to understand off-the-ball movement and timing of runs. The Double Triangle Pass drill also emphasizes the importance of communication between players and the use of both feet for passing.

Theoretically, the effectiveness of the Double Triangle Pass drill can be grounded in the Constructivism learning theory, specifically integrating the cognitive development perspectives of Jean Piaget and the sociocultural insights of Lev Vygotsky. From a Piagetian standpoint, players engage in continuous cognitive adaptation (assimilation and accommodation) as they adjust their motor schemas to the spatial constraints and dynamic movement patterns required by the double triangle formation. Furthermore, Vygotsky's concept of the Zone of Proximal Development (ZPD) is central to this drill. The exercise relies heavily on peer interaction, verbal communication, and collaborative off-the-ball movement, allowing players to scaffold each other's spatial awareness and decision-making abilities. By combining these cognitive and social constructivist elements with motor learning principles-such as training specificity and variable practice-the Double Triangle Pass goes beyond mere physical repetition, functioning as a holistic cognitive-motor intervention.

Based on the literature review, although there are several studies on the effectiveness of passing training in soccer and futsal, there is still a significant gap in the scientific literature. Previous research tends to focus on the soccer context or examine different passing training methods (e.g., individual diamond and triangle) in futsal. Specifically, there has been no empirical research directly testing the effectiveness of these training methods. The Double Triangle Pass improves futsal passing accuracy, particularly within the context of secondary school extracurricular programs in Indonesia. This gap suggests that much of the existing sports science research, while valuable, may not be specific enough for localized, practical interventions. This investigation is important because the physiological, psychological, and logistical demands of extracurricular school futsal may differ from those in professional or other sport contexts, making findings from more general research less applicable. Therefore, the novelty of this study lies in its attempt to fill this gap. This study will provide new empirical evidence regarding the specific impact of Double Triangle Pass training on passing accuracy in futsal. By focusing on extracurricular futsal students at SMA Negeri 1 Kuningan, this study is expected to provide a deeper understanding and contextually relevant data regarding effective training methods for the student athlete population.

Method

This study was designed using a quantitative approach with a One Group Pretest-Post-test Design. This design was chosen to evaluate the effect of an intervention on one group of subjects by comparing measurements before (pretest) and after (post-test) the treatment. The main objective of this design is to measure changes that occur in the dependent variable, in this case, futsal passing accuracy, after the administration of the Double Triangle Pass training treatment.

The One Group Pretest-Post-test design effectively demonstrates changes in the study group following an intervention. While this design is powerful in measuring changes within a group, it is important to acknowledge that it has limitations in establishing definitive cause-and-effect relationships due to the lack of a control group. This means that observed changes may also be influenced by external factors other than the treatment. A true experimental design with a control group was not feasible in this study due to the limited number of students enrolled in the extracurricular program, which prevented the formation of a separate, equivalent control team. Consequently, it is acknowledged that observed improvements may be partially influenced by external factors such as maturation or testing effects. Nevertheless, for the purpose of measuring effects in the context of skill improvement, this design remains relevant and provides a clear indication of the intervention's impact.

This research was conducted at SMA Negeri 1 Kuningan, located at Jl. Siliwangi No. 55, Purwawinangun, Kuningan District, Kuningan Regency, West Java 45511. The research was conducted over a total of 10 meetings in June 2024. This duration included two meetings allocated for testing (i.e., one pretest and one post-test) and eight meetings for administering the Double Triangle Pass training treatment. The pretest was administered at the first meeting, followed immediately by a training session. The post-test was then administered at the final meeting, after the eight treatment sessions had been completed. Accurate details regarding the number and duration of these meetings are crucial for the potential replication of the study and to ensure the study's internal validity.

The population of this study comprised the extracurricular futsal players at SMA Negeri 1 Kuningan. Based on updated attendance data during the research period, the population size was 25 active players. The sampling technique utilized was saturated sampling, where all 25 members of the population were included as research samples. This approach minimizes sampling bias and allows the research results to be generalized to the entire futsal extracurricular population of the school.

Data measurement techniques include the instruments used, testing the validity and reliability of the instruments, and the test implementation procedures applied to collect data.

Instrument is tool or facility Which used by researchers in collecting data to make the work easier and the results better, in the sense of being more precise, complete and systematic so that it is more easy processed (Arikunto, 2010). The instrument used in this study was a 30-second Passing and Stopping test. This instrument was specifically designed to measure the passing accuracy of futsal players. Instruments are tools or facilities used by researchers to collect data to make their work easier and produce better results, meaning they are more accurate, complete, and systematic, making them easier to process.

Instrument Which Good must fulfills two important prerequisites, namely validity and reliability. Validity is something size Which show levels validity or validity something instrument. Tall low validity instrument shows the extent to which the collected data does not deviate from description of the validity in question (Arikunto, 2010). Reliability pointing on One understanding that something instrument Enough can trusted to be used as a data collection tool because the instrument the Already Good. Instruments Which reliable will produce data which can trusted. In study This ongoing 10 time meeting treatment, and two meetings for the initial test (Pretest) and test end (Post-test).

Instrument validity indicates the extent to which the instrument is able to measure what should be measured. Validity testing is carried out through two approaches to ensure measurement accuracy: 1). Face Validity, namely the results of the Passing test instrument trial conducted through expert validity shows a face validity value of 0.572. This value is declared valid, indicating that the instrument is visually or based on expert assessment is considered appropriate to measure passing accuracy. 2). Data Validity, namely the validity test on pretest and post-test data was carried out using SPSS version 29 software. The significance value (Sig. 2-tailed) obtained from the data validity test is 0.001. Because this value is smaller than 0.05, the pretest and post-test data are declared valid. This dual approach in validity testing, namely through face validity by experts and statistical validity of the collected data, shows a comprehensive effort to ensure measurement accuracy. Although the face validity value of 0.572 is at the lower limit of the general criteria, the highly significant data validity ($p=0.001$) provides strong confidence that the collected data accurately represents the measured variables.

Instrument reliability refers to the consistency and stability of measurement results. A reliable instrument will produce reliable data when used repeatedly to measure the same object. Reliability testing is performed after validity testing, only on statements or questions that have been declared valid. The results of the reliability test of the Passing test instrument showed an r value of 0.91, indicating high reliability. Furthermore, reliability testing of the pretest and post-test data using Cronbach's Alpha yielded a value of 0.850. Because this value is greater than 0.60 (the general criterion for good reliability), the instrument is considered reliable. Instrument reliability refers to the consistency of measurement results. Since this study utilized a single test administered twice (pretest and post-test), test-retest reliability was the appropriate

statistical measure. The Pearson correlation analysis between the pretest and post-test scores yielded a coefficient of $r = 0.430$. This moderate correlation indicates an acceptable level of stability in the passing accuracy measurements over time.

The passing and ball control test was designed to evaluate players' speed and technical proficiency in executing passing and controlling a moving ball using their preferred foot. The assessment measured the number of successful pass-and-control sequences completed within a fixed time period. The equipment required for the test included futsal balls (minimum of one ball), two stopwatches, measuring tape, adhesive tape for marking the test area, and a futsal court equipped with a rebound wall. The test was administered by two testers, consisting of a timekeeper responsible for controlling the test duration and a recorder responsible for documenting the test results.

The test was conducted on a futsal court with a rebound wall measuring 3 m in width and 1 m in height. The distance between the rebound wall and the shooting line was 2.5 m, which served as the designated testing distance. At the beginning of the test, participants stood behind the shooting line in a ready position, using their dominant foot. Upon the "start" signal, participants continuously passed the ball against the rebound wall, controlled the returning ball, and immediately executed the next pass. This sequence was repeated continuously for 30 s. If the ball left the designated testing area, participants were required to retrieve it immediately and continue the test without any extension of the testing time. A trial was considered invalid if the participant controlled or kicked the ball beyond the designated boundary line.

Performance was assessed based on the total number of valid pass-and-control sequences completed within the 30-s testing period. One successful score was awarded for each complete cycle consisting of one accurate pass to the rebound wall followed by a successful control of the returning ball. The final score represented the total number of valid repetitions achieved during the test interval (Ismaryati, 2008). The Passing and Stopping test instrument (30 seconds) were developed and evaluated based on its validity and reliability. The validity of the instrument was assessed through expert judgment (face validity), and the analysis showed that the instrument was valid, with a validity coefficient of 0.572. The reliability of the instrument was examined using a test-retest method to determine its consistency and suitability for use in the study. The results showed a reliability coefficient of $r = 0.91$, indicating a high level of reliability.

The Passing and Stopping test measure the ability to kick a ball against a wall and stop the rebounding ball behind a marked line within 30 seconds. The test score is determined by the total number of legal kicks and successful stops performed by the participant during the 30-second period. One count (score of 1) is recorded for each complete cycle of kicking and successfully stopping the ball.

This research was conducted in 10 meetings or treatments, 2 times meeting for the initial test and final test, after the initial test it was continued immediately to the training and at the last meeting, namely the 8th meeting, it was carried out pretest. As for each practice, the time required is approximately 90 minutes with the following details. The warm-up up was a stretching and relaxing movement before do core exercises so that the muscles when doing movements sport No experience cramps or seizures muscle. Stretching Which in do that is jogging, stretching static and dynamic, then continued with samba gymnastics. Warm-up in do during 15 minutes. The core exercise focused on passing accuracy using the Double Triangle Pass drill. In this setup, players are organized into groups of six, forming two adjacent triangles. The drill involves continuous one-two combinations and third-man runs. Players must pass the ball sharply to the first target, immediately move into open space, and receive a return pass before transferring the ball to the adjacent triangle. This drill progressively increases in tempo and emphasizes spatial awareness, calling for the ball, and executing accurate passes under simulated match pressure. The core exercise lasted for 60 minutes per session. Cooling down was movement Which done Forrestore the body to its original condition through light movements. The cooling down that is done is dynamic movement. Cooling down and evaluating the exercise is done for 15 minutes. After treatment as much as 10 time meeting so test end For find out the correct results of the Passing exercise achieved by the sample after given treatment or treatment.

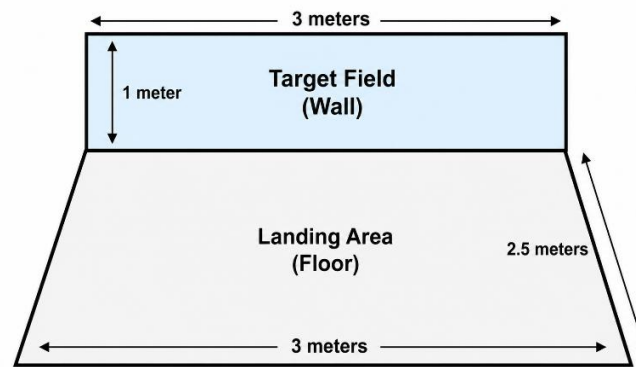


Figure 1. Passing Test Field
(Source : Ismaryati, 2008)

Analysis was performed to systematically process and interpret the collected data. Prior to hypothesis testing, the data was subjected to a prerequisite test to ensure compliance with statistical assumptions. All data analysis was performed using SPSS version 29 software. The prerequisite tests for data analysis consist of the first, the normality test, conducted to determine whether the research data sample (pretest and post-test results of passing accuracy) is normally distributed. This test is an important part of the prerequisite test before conducting statistical analysis for hypothesis testing. The test criteria used are: data is considered normal if the significance value (Sig.) is greater than 0.05. The results of the normality test show a significance value of 0.476. Because this value is greater than 0.05, it can be concluded that the pretest and post-test data of passing accuracy are normally distributed. Confirmation of normal distribution in pretest and post-test data is a crucial step that validates the use of parametric statistical tests, such as the t-test, in hypothesis analysis. This ensures that the basic assumptions of the selected statistical test are met, thereby increasing the reliability and strength of statistical inferences from the research findings. Second, the homogeneity test, was conducted to check the equality of variance between data groups, ensuring that the data came from populations with similar variations. The test criteria used were: data is considered homogeneous if the significance value (Sig.) is greater than 0.05. The results of the homogeneity test showed a significance value of 0.289. Since this value is greater than 0.05, it can be concluded that the data variance in this study is homogeneous. Confirmation of homogeneity of variance is another important prerequisite for the Paired Sample t-test, ensuring that the observed differences between the pretest and post-test are not solely due to differences in unequal data distribution. This further validates the selection of the Paired Sample t-test as an appropriate analysis method, strengthening the statistical basis for drawing conclusions. Third, Paired Sample t-test was used to test the hypothesis to determine whether the Double Triangle Pass training had an effect on the passing accuracy of futsal extracurricular students at SMA Negeri 1 Kuningan.

Results

This research is an experimental research which aims to knowing the effect of Double Triangle Pass training on passing accuracy futsal extracurricular activity at SMA Negeri 1 Kuningan. To determine the influence Double Triangle Pass exercise Therefore, the researcher uses the method experiment with sample student as much as 25 student. Study the given a pretest (initial test) in the form of a passing accuracy test. Next, the sample given treatment that is in the form of program exercise Double Triangle Pass for 10 times. After the 10 exercises are completed, a post-test is conducted. (test end) in the form of test accuracy Passing. Results pretest And post-test can seen on the following table.

Table 1. Data Pretest Results Research - Post-test

Subject	Pretest	Post-test	Difference
1	18	23	5
2	17	26	9
3	18	25	7
4	19	27	8
5	19	29	10
6	17	27	10
7	16	20	4
8	16	26	10

Subject	Pretest	Post-test	Difference
9	17	22	5
10	19	28	9
11	18	22	4
12	20	26	6
13	19	28	9
14	17	24	7
15	16	19	3
16	16	23	7
17	18	25	7
18	17	26	9
19	17	23	6
20	15	20	5
21	19	27	8
22	14	16	2
23	16	22	6
24	15	29	14
25	17	24	7

As shown in Table 1, all 25 participants demonstrated an improvement in passing accuracy, with the difference in scores ranging from a minimum increase of 2 points to a maximum of 14 points. No participants experienced a decline or stagnation in their passing performance after the intervention.

Accuracy Pretest Passing

The results of the descriptive analysis of the pretest data on passing accuracy are data ability accuracy passing Which taken before respondents given training treatment in the form of an exercise program Double Triangle Pass. Results study the described use analysis descriptive statistics as follows, for pretest results the minimum value = 14, maximum value = 20, mean = 17.20, median = 17, mode = 17, with std. Deviation = 1.50. Next, the pretest data is arranged in a distribution table frequency with moreover formerly determine amount class (KI) = $1+3.3\log N = 1+3.3\log 25 = 5$; range (R) = mark max-value min = $20 - 14 = 6$; and class length (P) = $R/KI = 6/5 = 1.2$. The following is the distribution table frequency which is obtained:

Table 2. Distribution Frequency Data Accuracy Pretest Passing

Class Interval	Frequency	Frequency Relatively	Frequency Cumulative
14 – 15.2	3	12%	12%
15.2 – 16.4	5	20%	32%
16.4 – 17.6	7	28%	60%
17.6 – 18.8	4	16%	76%
18.8 - 20	6	24%	100%
Amount	25	100%	

From the table above, 3 students are found to be in the interval 14 – 15.2, 5 students at intervals 15.2 – 16.4, 7 students at intervals 16.4 – 17.6, 4 student on interval 17.6 – 18.8, And 1 student on interval 18.8-20. Following histogram data pretest accuracy of passing.

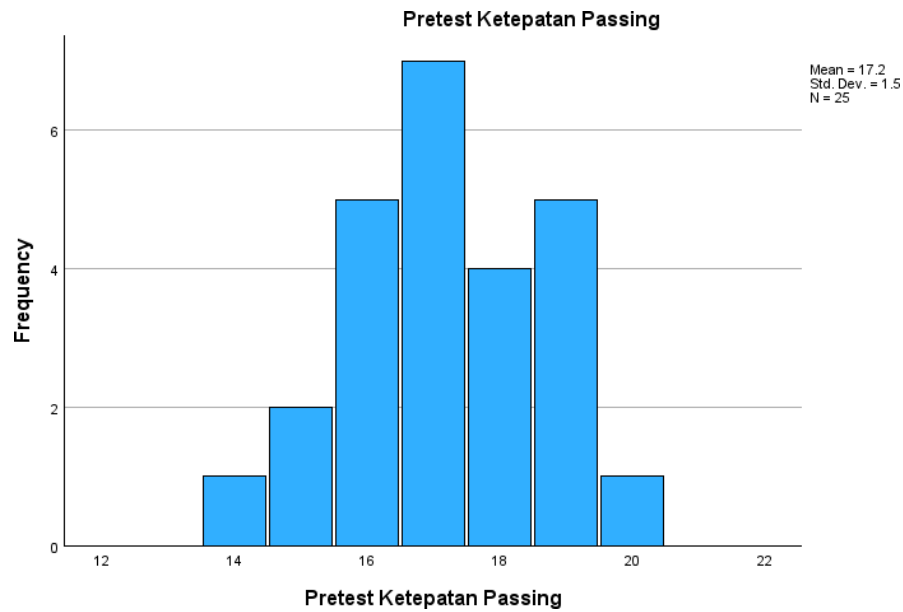


Figure 2. Histogram Pretest Accuracy Passing

Based on on histogram Mark pretest accuracy passing The largest was in the interval 18.8 – 20, totaling 6 students and the pretest score accuracy passing the smallest is on interval 14 – 15.2 amount to 3 student.

Post-test Passing Accuracy

The results of the descriptive analysis of the pretest data on passing accuracy are data on passing accuracy ability taken after respondents were given training treatment in the form of an exercise program Double Triangle Pass. Results study the described use analysis statistics descriptive as follows, for the results post-test minimum score = 16, score maximum = 29, mean = 24.28, median = 25, mode = 26, with standard deviation = 3.29. Next, the post-test data is arranged in a frequency distribution table. with moreover formerly determine amount class (KI) = $1+3.3\log N = 1+3.3\log 25 = 5$; range (R) = mark max-value min = $29 - 16 = 13$; and long class (P) = $R/KI = 13/5 = 2.6$. Following table distribution frequency which obtained:

Table 3. Distribution Frequency Data Post-test Accuracy Passing

Class Interval	Frequency	Frequency Relatively	Frequency Cumulative
16-18.6	1	4%	4%
18.6-21.2	3	12%	16%
21.2-23.8	6	24%	40%
23.8-26.4	8	32%	72%
26.4-29	7	28%	100%
Amount	25	100%	

From the table above, 1 student is found to be in the interval 16 - 18.6, 3 students at intervals 18.6 - 21.2, 6 students at intervals 21.2 - 23.8, 8 student on interval 23.8 - 26.4, And 7 student on interval 26.4 - 29. Following histogram post-test data on passing accuracy.

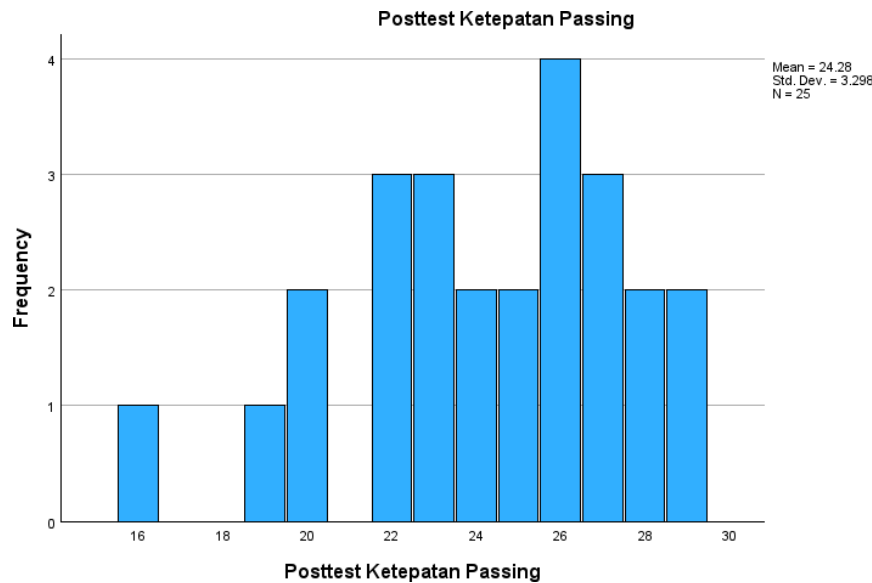


Figure 3. Histogram Post-test Accuracy Passing

Based on on histogram mark post-test on accuracy passing The largest was in the interval 26.4 - 29, totaling 7 students and the post-test score accuracy passing smallest is at on interval 16 - 18.6 totaling 1 student.

The instrument's validity was established through face validity evaluated by experts (validity coefficient = 0.572). For reliability, since the instrument was administered twice (pretest and post-test) to the same subjects, test-retest reliability was utilized instead of internal consistency measures. The Pearson correlation between the pretest and post-test scores was significant ($r = 0.430$, $p = 0.032$), indicating an acceptable level of stability for the passing accuracy test over time.

Before done analysis data, will done test prerequisite Data analysis includes normality tests. Prerequisite test results The analysis is presented below:

Before conducting data analysis, prerequisite testing will be carried out, namely the normality test. The normality test was strictly applied to the pretest and post-test variables independently (not the pooled residuals) to satisfy the assumptions of the paired sample t-test. Results of normality test for pretest and post-test accuracy passing can be seen on the table below:

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Passing	.150	25	.154	.940	25	.148
Post-test Passing	.125	25	.200*	.965	25	.521

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The normality test was conducted independently on the pretest and post-test scores using the Shapiro-Wilk test, which is highly recommended for small sample sizes ($N < 50$), to fulfill the assumptions of the parametric paired sample t-test. The analysis revealed that both the pretest data (Sig. = 0.148) and the post-test data (Sig. = 0.521) were normally distributed, as both significance values were greater than 0.05 ($p > 0.05$). This confirms that the data met the prerequisite for parametric hypothesis testing.

Hypothesis testing was carried out using a Paired Sample t-test on each data group, both Pretest and Post-test. The results of the analysis are said to be significant if the value significance is less than 0.05. To determine the increase in accuracy passing, tested with look for difference ability accuracy passing before and after being given training treatment Double Triangle Pass. The results of the Paired Sample t-test are shown in the following table.

Table 5. Summary of t-test results

Variables	Mean	T count	Df	Sig	Information
Pretest	17.20	-13,386	24	.001	Significant
Post-test	24.28				

Based on the table above, the calculated t value is -13.386 which means influence direction between variables in a way opposite, sign positive And negative only show direction study.

The hypothesis testing was conducted using a Paired Sample t-test. The analysis yielded a t-value of -13.386 with a significance level of $p = 0.001$ ($p < 0.05$), leading to the rejection of the null hypothesis (H_0) and the acceptance of the alternative hypothesis (H_a). Furthermore, to evaluate the practical significance of the intervention, the effect size was calculated. The analysis produced a very large effect size (Cohen's $d = 2.68$). This indicates that the Double Triangle Pass training program not only had a statistically significant impact but also a highly substantial practical effect on improving the passing accuracy of the extracurricular futsal players.

Discussion

The purpose of this study was to analyze the effect of Double Triangle Pass training on passing accuracy in futsal extracurricular students at SMA Negeri 1 Kuningan. The results consistently showed a significant increase in passing accuracy after the Double Triangle Pass training treatment. This can be seen from the comparison of the average pretest score of 17.20 with the average post-test score which increased to 24.28. This average increase indicates that the implemented training program is effective in improving students' passing abilities. Furthermore, statistical analysis using the t-test produced a significance value of 0.001. Because this significance value is smaller than 0.05, the working hypothesis (H_a) which states that there is an effect of Double Triangle Pass training on passing accuracy is accepted, and the null hypothesis (H_0) is rejected. This strongly supports the conclusion that Double Triangle Pass training has a positive and significant impact on passing accuracy in futsal.

These findings align with the importance of passing accuracy in futsal, which is characterized by limited space and a fast tempo. Accurate passing is essential for maintaining possession, controlling the tempo of the game, and exploiting empty spaces, ultimately increasing a team's chances of winning. Initial observations indicated inconsistencies in the passing accuracy of futsal extracurricular players at SMA Negeri 1 Kuningan, which hampered the implementation of team tactics. Therefore, the effectiveness of the Double Triangle Pass exercise in addressing this gap is highly relevant. This exercise is designed to simultaneously improve passing accuracy, ball control, off-the-ball movement, and teamwork, with an emphasis on communication and the use of both feet for passing.

The significant improvement observed can be explained through the lens of motor learning and cognitive constructivism. Unlike static passing drills, the Double Triangle Pass demands high cognitive load and variable practice. Players must continuously scan their environment, anticipate their teammate's movement, and adapt their motor schemas (assimilation and accommodation) to a dynamic spatial setup. This aligns with the concept of training specificity in motor learning; the drill replicates the intense, multi-directional passing scenarios encountered in actual futsal matches. The continuous third-man runs force players to process visual information rapidly, thereby reducing reaction time and improving the weighting and accuracy of the pass under simulated pressure.

When compared with previous research, the results of this study provide a unique contribution. For example, Priawan (2018) found that the triangle passing training model was more significant in improving soccer passing accuracy than the diamond model (Priawan, 2018). Similarly, Hasbullah et al. (2014) demonstrated a significant effect of playing methods on soccer passing learning outcomes. However, these studies focused on soccer, so differences in pitch and technique between the two sports need to be considered. In the context of futsal, Hafidhurrifqi and Utomo (2022) examined the effects of the diamond and triangle short passing training methods and concluded that both were effective without significant differences (Hafidhurrifqi & Utomo, 2022). Our study extends these findings by specifically testing the Double Triangle Pass, which integrates aspects of one-two passing and third-person passing in small and large spaces, providing a more comprehensive approach to training the tactical and technical aspects of passing in futsal.

Several other studies support the importance of passing training and its variations. Marjiano (2023) reported that active rectangular passing training resulted in a greater increase in passing accuracy (10.09%) compared to active triangular passing training (8.78%) in an extracurricular futsal team (Marjiano, 2023). Furthermore, Festiawan et al. (2024) found that both active and passive passing training significantly improved futsal passing accuracy (Festiawan et al., 2024). Research by Suhardianto et al. (2025) also

reported a significant 27.4% increase in basic futsal passing techniques after implementing the triangular training model (Suhardianto et al., 2025). Meanwhile, Zainuddin et al. (2023) showed that one-touch passing techniques were more effective in improving futsal passing accuracy than two-touch techniques (Zainuddin et al., 2023).

From a practical perspective, these findings offer actionable insights for futsal coaches and physical education teachers. To effectively implement the Double Triangle Pass drill, coaches are recommended to allocate at least 60 minutes of the core training session to this specific method, ideally conducted 2 to 3 times a week. Coaches should apply a progressive overload principle: starting with passive pressure to build foundational accuracy, and gradually introducing active defenders into the triangles to simulate real-game psychological and tactical stress.

Despite the positive outcomes, this study has notable limitations that must be acknowledged. The use of a one-group pretest-post-test design without a control group means that definitive causal conclusions cannot be drawn. The observed improvements in passing accuracy might be partially confounded by maturation effects (natural physical or technical development over time), testing effects (increased familiarity with the 30-second passing test), or historical factors (other physical activities the students engaged in outside of the intervention). Therefore, future research should utilize more robust methodologies, such as Randomized Controlled Trials (RCTs) with larger and more diverse samples, and compare the Double Triangle Pass directly against other passing interventions to isolate its specific effects.

Conclusion

In conclusion, this study demonstrates that the Double Triangle Pass training program has a significant and positive effect on improving futsal passing accuracy among extracurricular players ($p = 0.001$, Cohen's $d = 2.68$). Rather than definitively proving causation, these findings show promising effectiveness that supports motor learning and cognitive constructivist theories in skill acquisition. For practical application, it is recommended that physical educators and coaches routinely implement this drill within a progressive training structure, gradually increasing spatial pressure and intensity. Future studies utilizing controlled experimental designs and larger samples are encouraged to further validate and expand upon these findings.

Acknowledgements

The authors would like to thank the Faculty of Teacher Training and Education, Al-Ihya Islamic University, Kuningan, for providing facilities and administrative support during this research.

Conflicts of Interest

The authors declare no conflict of interest.

References

- Arikunto, S. (2010). *Prosedur penelitian: Suatu pendekatan praktik*. Rineka Cipta.
- Dwiyanto, A. (2011). *Tingkat keterampilan teknik dasar futsal siswa peserta ekstrakurikuler futsal di SMA Negeri 3 Klaten* [Unpublished bachelor's thesis]. Universitas Negeri Yogyakarta.
- Festiawan, R., Kusuma, I. J., Hidayat, R., & Ngadiman, N. (2024). Meningkatkan ketepatan passing futsal: Mengeksplorasi dampak metode latihan passing pasif dan aktif. *Sepakbola*, 4(1), 1–9.
- Fitrian, Z. A., Ali, S. G., Ahmad, N., & Mirza, A. (2023). The positive impact of small-sided games training on VO2 max and passing accuracy in futsal players. *International Journal of Human Movement and Sports Sciences*, 11(1), 233-240. <https://doi.org/10.13189/saj.2023.110127>
- Ghozali, I. (2016). *Aplikasi analisis multivariete dengan program IBM SPSS 23* (8th ed.). Badan Penerbit Universitas Diponegoro.
- Hafidhurriqi, H., & Utomo, A. W. (2022). Pengaruh metode latihan short passing diamond dan short passing triangle terhadap peningkatan kemampuan passing accuracy peserta ekstrakurikuler futsal MAN 2 Kota Madiun. *Journal Power of Sports*, 5(2), 121. <https://doi.org/10.25273/jpos.v5i2.16394>
- Hasbullah, H., Wiwik, Y., & Ahmad, A. (2014). Pengaruh metode bermain terhadap hasil belajar passing sepak bola menggunakan kaki bagian dalam. *Jurnal Pendidikan dan Pembelajaran Khatulistiwa (JPPK)*, 3(6). <https://doi.org/10.26418/jppk.v3i6.6029>
- Ismaryati. (2008). *Tes dan pengukuran olahraga*. UNS Press.
- Kuroma, R. Z., & S., A. (2025). Analysis of training methods for passing accuracy in futsal sports: Systematic literature review. *Competitor: Jurnal Pendidikan Keolahragaan*, 17(1), 47–58.
- Marjiano, V. Y. (2023). Pengaruh metode latihan passing aktif segitiga dan segiempat terhadap akurasi passing pemain pada tim futsal ekstrakurikuler SMK PGRI 3 Walikukun. *Tamilis Synex: Multidimensional Collaboration*, 1(2), 54–65.

- Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press.
- Priawan, N. (2018). Pengaruh model latihan passing diamond dan model latihan passing triangle terhadap akurasi passing sepakbola pada pemain Persatuan Sepakbola Seluruh Tridadi (PSST) tahun 2018. *Jurnal Pendidikan Kepelatihan Olahraga*, 7(5).
- Rahmat. (2020). *Strategi dasar permainan sepak bola*. Kos Globalindo Group.
- Saputra, R. A., Hermawan, P. R., Harry, P., & Martin, S. (2025). Pengaruh latihan passing aktif berpasangan dan berkelompok terhadap akurasi passing futsal SMANDA. *Indonesian Journal for Physical Education and Sport*, 6(1).
- Setiawan, K. N., & Sudarmono, M. (2021). Pengaruh latihan dribble x pattern dan dribble figure eights terhadap hasil kemampuan dribble atlet Sheyfa Futsal Academy Kendal. *Indonesian Journal for Physical Education and Sport*, 2(1), 287–293.
- Sugiyono. (2017). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Suhardianto, F., Yusmawati, Y., & Setiawan, I. (2025). The effect of triangle training model on basic futsal passing technique skills of Megarezky University students. *Proceedings of the 2nd ICHEST 2025*, 1(35), 20–25.
- Thomas, A., Rustiadi, T., & Hartono, M. (2021). The effect of training methods and eye-foot coordination on football passing accuracy. *Journal of Physical Education and Sports*, 10(3), 272–276.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Zainuddin, M. S., Usman, A., Kamal, M., & Asyhari, H. (2023). Peningkatan akurasi passing pada permainan futsal SMA Negeri 20 Pangkep. *Jurnal GEMBIRA*, 1(6), 1523–1528.