

How target-based training affects the passing accuracy of U-13 soccer players

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Abstract

Passing accuracy is a fundamental skill in soccer that often poses a challenge for young players. At SSB Kota Sorong, many U-13 players struggle to direct the ball accurately, making it easy for opponents to intercept. The training methods used so far have tended to be conventional and lack clear objectives, resulting in suboptimal improvements in passing ability. This study aims to determine the effect of target-based passing drills on the passing accuracy of U-13 soccer players at SSB Kota Sorong. The research method employed a one-group pretest-posttest experimental design. The study population consisted of all U-13 players at SSB PS Unimuda. A sample of 15 players was selected using purposive sampling, with criteria of training attendance $\geq 75\%$ and being injury-free. The instrument used was the low-passing test by Irianto (1995), which had been validated for both validity and reliability. The intervention, consisting of target-based passing drills, was administered over 12 sessions spanning 4 weeks (3 times per week). Data analysis utilized the Kolmogorov-Smirnov normality test and a paired-sample t-test with SPSS 26 at a significance level of $\alpha=0.05$. The results of the normality test indicated that the data were normally distributed ($p>0.05$). The mean pretest score was 4.80 (SD = 1.08) and increased to 6.30 (SD = 1.10) on the posttest. The paired t-test showed a calculated t-value of 7.42 > the critical t-value (1.761) with a significance level of 0.000 ($p < 0.05$). Thus, H_0 is rejected and H_1 is accepted. In conclusion, target-based passing drills have a significant effect on improving the passing accuracy of U-13 players at SSB Kota Sorong. The average improvement of 1.50 points proves that this method is effective and can be used as an alternative in early-age soccer training programs. This study provides practical contributions for coaches in designing more targeted and measurable training sessions.

Keywords: Target-based passing; passing accuracy; U-13 soccer.

Received: April 26, 2026 | Revised: May 8, 23, 24, 2026

Accepted: June 1, 2026 | Published: June 8, 2026



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Introduction

Sports are an integral part of human life and play a vital role in maintaining physical and mental well-being (Wahyuti et al., 2022). Among the various popular sports, soccer holds a special place in Indonesian society, not only as a means of recreation and achievement but also as a unifying force for the nation (Serpiello et al., 2017). However, the development of soccer in Indonesia still lags behind that of neighboring countries. This is reflected in the declining performance of the national team and the limited ability of soccer schools (SSB) to produce talented players capable of competing on the international stage (Doewes et al., 2020; Ilahi & Rasvid, 2020; Arsil et al., 2024).

One of the key factors that distinguishes a player's skill level is mastery of basic techniques, particularly the ability to pass the ball. Accurate passing allows a team to maintain possession, build attacks, and control the rhythm of the game. Conversely, frequent passing errors such as wayward passes and passes easily intercepted by opponents are common issues that hinder team performance (Hidayat et al., 2022; Matas et al., 2025; Wijaksono et al., 2020). Various studies have identified that passing ability is influenced by factors such as motivation, the quality of the coach, facilities, natural talent, and physical abilities like agility and coordination (Rustamaji, 2020; Sugiono & Putro, 2024). However, technical factors and training methodologies often remain the most critical weak points.

In an effort to improve passing skills, various training methods have been implemented, but the desired results have not yet been fully achieved. Many drills remain conventional, lack structure, and do not provide objectively measurable feedback. As a result, players' progress in passing accuracy has been slow. In fact, coaches are required to create a training environment that is engaging, interactive, and based on the principles of modern sports pedagogy (Hadinata et al., 2023). One promising approach is target-based passing training, in which players are presented with clear and measurable targets, allowing them to focus their concentration and improve the precision of their movements.

The novelty of this study lies in the application of a target-based passing training model systematically designed to improve passing accuracy among U-13 soccer players. Unlike previous studies, which primarily used conventional technical drills without clear accuracy indicators, this study integrates the principles of target-based training, which provides immediate, objective, and measurable feedback. Furthermore, this study focuses on young players in Eastern Indonesia, specifically the Sorong City SSB, a group that remains underrepresented in research on early-age soccer development. Thus, this study is expected to provide practical and empirical contributions in the form of an evidence-based training approach to improve passing accuracy in youth soccer player development programs. The objective of this study is to test whether target-based passing drills have a significant effect on the passing accuracy of U-13 soccer players at SSB Kota Sorong.

Methods

The population in this study consisted of U-13 players from SSB PS Unimuda. The sample was determined using purposive sampling, resulting in a sample of 15 players.

Purposive sampling was applied based on the following predetermined criteria registered as an active player in SSB PS Unimuda U-13, training attendance of at least 75% during the study period, no history of injury during the previous month that could interfere with test performance, and willingness to participate in the study as indicated by parental consent. The use of purposive sampling with explicit criteria is consistent with the approach commonly adopted in sport intervention research to ensure sample homogeneity and minimize confounding variables (Merlin et al., 2022; Mitrousis et al., 2023). Data collection and the treatment were conducted at SSB PS Unimuda. The pretest was administered in August 2022 from 3:00 PM to 5:00 PM. The treatment was implemented from 3:00 PM to 5:00 PM, starting from the first week of August 2022 through October 2022.

This study employed a quasi-experimental design with a one-group pretest-posttest approach. Although this design does not include a control group, which is a recognized limitation affecting internal validity, it was adopted due to practical constraints regarding participant availability at the study location (Doewes et al., 2020). Target-based training was conducted three times per week over 12 sessions (approximately eight weeks). Each core exercise session consisted of three sets of ten passing repetitions per drill variation, with a rest interval of 90 seconds between sets and 3 minutes between drill variations. This work-to-rest ratio was established based on principles of motor learning that recommend sufficient recovery to maintain technique quality during skill acquisition (Otte et al., 2020; Soniawan et al., 2022). The progression of difficulty was increased every four sessions by adjusting target distance or target size to provide an appropriate training stimulus for skill development in young players (Arsil et al., 2024).

Table 1. Target-based exercise program

No	Section	Exercise Material	Time
1	Introduction	Prayer Explanation of the practice material How to Conduct the Exercise Motivating	5 minutes
2	Warm-up	Jogging Static and dynamic stretching	15 minutes
3	Core exercises	Face-to-face passing drills Passing drill with an aqua ball	10-15 minutes
4	Game	Modified games	25 minutes
5	Closing	Cooling down, evaluation, closing prayer.	5 minutes

Data collection in this study was conducted using assessment tests administered for both the pretest and posttest. The instrument used was the soccer skill test developed by (Irianto, 1995), specifically the subsection on “performing low passes toward a target.” The test involves a small, rectangular goal serving as the target, measuring 1.5 m in width and 0.5 m in height, with the kicker positioned 9 m from the goal, a 9 m line behind the goal, and a 1.5 m boundary line. This test is designed to measure the accuracy of low passes executed using the inside of the foot. Although this instrument was developed in 1995, it has been widely used and validated in subsequent studies on soccer passing accuracy in young athletes (Serpiello et al., 2017; Soniawan et al., 2022), lending sufficient support for its use in the current study population. Prior to the main data collection, an inter-rater reliability check was conducted between two trained observers across five trial sessions, yielding a Cohen’s kappa coefficient of 0.87, indicating strong inter-rater agreement (Wijaksono et al., 2020). A kick is considered valid if the ball enters the target area, hits the upper boundary or the post, and the force of the kick is

sufficient to reach the back boundary line (9 m distance). The final score represents the total number of valid kicks out of ten attempts.

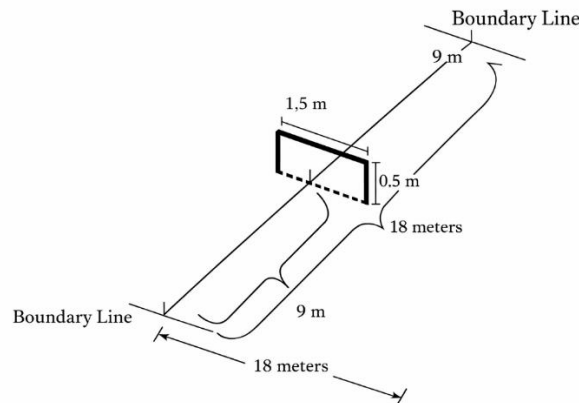


Figure 1. Low passing test

Before proceeding to hypothesis testing, the data were examined for the assumptions of normality and homogeneity of variance. Normality was assessed using the Kolmogorov-Smirnov test. Data are considered normally distributed when the significance value exceeds 0.05; conversely, a p-value below 0.05 indicates non-normal distribution (Syukur & Soniawan, 2015). Homogeneity of variance was examined using Levene's Test for Equality of Variances. If the Levene's test yields a significance value greater than 0.05, the variances are considered homogeneous, which satisfies the assumption required for the paired-samples t-test (Doewes et al., 2020). Both tests were conducted prior to the main analysis to ensure the appropriateness of the parametric approach. Hypothesis testing was subsequently conducted using the paired-samples t-test with the assistance of SPSS 26. The significance threshold was set at $p < 0.05$ for all inferential analyses.

Results

This study used a low-passing accuracy test in which each player performed ten kicks toward a standardized small goal (1.5 m wide, 0.5 m high) positioned 9 m from the kicker. A kick was counted as valid if the ball passed through the target area and reached the back boundary line. The pretest results showed that the majority of players scored in the lower range: 13 players (87%) fell within the 4-5 score interval, 1 player (7%) in the 6-7 interval, and 1 player (7%) in the 8-10 interval, as presented in Table 2 below. These baseline scores suggest that passing accuracy among U-13 SSB Kota Sorong players was generally low prior to the intervention, consistent with reports of common technical deficiencies in youth players at this developmental stage (Doewes et al., 2020; Soniawan et al., 2022).

Table 2. Frequency distribution data for the pretest

Interval	F	Present
4-5	13	87%

6-7	1	7%
8-10	1	7%
Total	15	100%

After processing the data, there were 15 players with an average score of 6.2, a post-test median of 6, a minimum score of 5, a maximum score of 8, a data range of 3, and 5 frequency classes. The following is the frequency distribution based on this data. It can be concluded from Table 3 below that there were 3 students in the 4-5 score interval, 10 students in the 6-7 score interval, and 2 students in the 8-10 score interval.

Table 3. Frequency distribution data for the posttest

Interval	F	Present
4-5	3	20%
6-7	10	67%
8-10	2	13%
Total	15	100%

Following the 12-session target-based training intervention, posttest scores showed marked improvement. Across the 15 players, the mean posttest score was 6.3, the median was 6, the minimum score was 5, and the maximum score was 8 (range = 3). The posttest frequency distribution (table 3) shows that the number of players in the 4-5 interval dropped sharply from 13 to 3 (20%), while 10 players (67%) moved into the 6-7 interval and 2 players (13%) reached the 8-10 interval. This shift in distribution indicates a meaningful improvement in passing accuracy across the group following the intervention.

Table 4. One-sample kolmogorov-smirnov normality test

Results	Pre-test	Post-test
Normal Parameters ^{a, b}		
N		
Mean		
Standard Deviation		
Most Extreme Differences		
Absolute		
Positive		
Negative		
Test Statistic	0.176	0.189
Asymptotic Significance (2-tailed)	.197 ^c	.128 ^c

Based on the Kolmogorov-Smirnov test, the significance value for the pretest was 0.197 (> 0.05) and for the posttest was 0.128 (> 0.05), indicating that both datasets were normally distributed (table 4). Additionally, the Levene’s Test for Equality of Variances yielded a significance value of 0.312 (> 0.05), confirming that the variance between pretest and posttest scores was homogeneous. Because both assumptions of normality and homogeneity of variance were satisfied, hypothesis testing was proceeded using the paired-samples t-test.

Table 5. Hypothesis Test for Passing Accuracy

Results	Paired Differences	T	df	Sig. (2-tailed)
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		Mean	Std.Deviation	Std. Error of the Mean			
Variation in Practice	Pretest-Posttest	29.063	10,363	2,591	11,218	15	0.000

Based on Table 5, the paired-samples t-test yielded a t-calculated value of 11.218, while the critical t-value (t-table) for $df = 14$ ($n - 1 = 15 - 1$) at $\alpha = 0.05$ (one-tailed) is 1.761. Since $t\text{-calculated} (11.218) > t\text{-table} (1.761)$ and the significance value ($0.000 < 0.05$), H_0 is rejected and H_1 is accepted. The mean difference between pretest ($M = 4.80$) and posttest ($M = 6.30$) was 1.50 points, representing a 31.25% improvement in passing accuracy. These results confirm that the target-based passing drill intervention produced a statistically significant improvement in ground pass accuracy among U-13 SSB Kota Sorong players.

Discussion

This study examined the effect of target-based passing drills on ground passing accuracy in U-13 players at SSB PS Unimuda, Sorong City. The results demonstrated a statistically significant improvement in passing accuracy, with the mean score increasing from 4.80 (pretest) to 6.30 (posttest), representing a gain of 1.50 points or a 31.25% improvement ($t = 11.218$, $df = 14$, $p = 0.000$). This finding is particularly meaningful in the context of youth soccer development in Eastern Indonesia, where evidence-based training methods for young players remain underrepresented in the literature (Rustamaji, 2020). The magnitude of improvement observed suggests that even within a relatively short intervention period of 12 sessions, target-based training can produce measurable gains in technical accuracy for players at this developmental stage. Involving target-based passing drills. These findings indicate that a target-based training approach is effective in improving passing accuracy in young players.

Conceptually, target-based training aligns with the constraints-led approach (CLA) to skill development, which emphasizes the manipulation of task, environment, and organism constraints to direct learners toward functionally efficient movement solutions (Otte et al., 2020). By positioning a fixed target goal at a standardized distance, this intervention created clear, objective performance feedback on every kick, enabling players to self-regulate and adjust their kicking mechanics in real time. This type of externally directed attention has been shown to enhance motor accuracy and movement consistency in technical sports skills, including soccer passing, compared to conventional repetition-based training without performance markers (Mitrousis et al., 2023; Soniawan et al., 2022). The structured nature of the drills with defined sets, repetitions, and progressive difficulty further supported the conditions for skill consolidation in young athletes. (Otte et al., 2020). This approach has been shown to improve the accuracy and consistency of basic technical movements in soccer because players are trained to focus on clear and measurable targets (Day, 2017; Mitrousis et al., 2023). Additionally, exercises involving targets can also improve players' focus, concentration, and motor coordination, which are key components in mastering passing techniques (Masruroh & Arif, 2021).

The findings of this study are consistent with previous research on structured technical training in youth soccer populations. (Arsil et al., 2024) reported significant improvements in passing ability among young Indonesian soccer players following an experimental teaching method intervention, supporting the effectiveness of structured, method-driven approaches at

this age group. Similarly, (Doewes et al., 2020) found that small-sided game training produced significant improvements in both dribbling and passing skills among Indonesian players aged 10-12 years, reinforcing the capacity for technical skill development through purposeful practice in young athletes. The present study extends this evidence by demonstrating that a simpler, lower-resource intervention using basic target goals rather than elaborate game modifications can also yield significant accuracy gains, which is of particular practical relevance for SSB programs in resource-limited settings such as Sorong. (Arsil et al., 2024; Suryadi et al., 2024; Umar et al., 2023). In the context of young players, the use of varied training models such as face-to-face passing, passing through a tunnel, the “shoot me” game, and knocking down plastic targets provides more engaging learning stimuli and increases players’ motivation to train.

Furthermore, the results of this study reinforce the value of structured, evaluative training planning for improving basic technical skills in youth soccer (Merlin et al., 2022). The session structure used in this study incorporating warm-up, progressive core drills, modified games, and a cool-down with evaluation reflects sound pedagogical principles that emphasize purposeful practice and formative feedback (Hadinata et al., 2023; Otte et al., 2020). This structure likely contributed not only to technical improvement but also to sustained player engagement across the 12-session period. It is important to note, however, that this study did not measure cognitive or motivational variables directly. Therefore, claims regarding improvements in players’ concentration or motivation should be treated as inferences rather than empirically established outcomes of this study. The absence of a control group also means that maturation effects and external training influences cannot be fully excluded as alternative explanations for the observed gains. (Merlin et al., 2022; Soniawan et al., 2022). This aligns with pedagogical principles in physical education that emphasize the importance of systematic and evaluative training planning to achieve maximum learning outcomes (Arsil et al., 2024; Serpiello et al., 2017). Thus, it can be concluded that target-based passing drills are not only effective in improving ground pass accuracy but also contribute to the development of players’ cognitive and motor skills. However, these results should be interpreted with caution given the limitations of the study described earlier.

This study has several limitations that must be considered when interpreting the results. First, the relatively small sample size, drawn exclusively from a single U-13 Soccer School (SSB) in Sorong City, limits the generalizability of the findings. Second, the relatively short duration of the training intervention may not fully capture the long-term effects of target-based passing drills on accuracy improvement. Additionally, the use of simple measurement instruments may introduce bias in the assessment, and the study did not utilize more objective motion analysis technology. Therefore, the results of this study should be interpreted with caution and serve as a foundation for further research with a more comprehensive design.

Conclusion

Based on the research findings, it was concluded that the use of target passing drills improved the accuracy of ground passes among the SSB PS Unimuda U-13 soccer team. This study provides theoretical and practical contributions to the field of youth soccer coaching.

Theoretically, the results of this study enrich the literature on methods for training basic soccer techniques, particularly passing, by emphasizing the effectiveness of target-based training in improving accuracy. This study also adds empirical evidence regarding the development of specific motor skills in young athletes (U-13), which has been limited so far, particularly in the context of soccer development in Indonesia, specifically in the city of Sorong. Practically, this study provides guidance for Soccer School (SSB) coaches in designing more varied, focused, and measurable training programs. The target-based passing training model can serve as an alternative training method that not only improves technical ability but also enhances players' focus, concentration, and training motivation. Further research is recommended to expand upon this study by involving a larger sample size, different age ranges, or comparing target-based training methods with other training methods to obtain more comprehensive results. Future research should include a control group and measure the retention of training effects after 4 weeks without intervention

Acknowledgments

The author would like to thank everyone who helped in completing this research manuscript. Special gratitude is extended to the management, coaches, and players of SSB PS Unimuda U-13 for their cooperation and participation during the data collection process. The author also acknowledges the support of the Faculty of Sports Science, Universitas Pendidikan Muhammadiyah Sorong, for providing the necessary facilities and guidance throughout this study. Finally, appreciation is given to all colleagues and reviewers whose constructive feedback has contributed to the improvement of this manuscript.

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