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The Implementation of Futsal-Based Training To Enhance Passing Skills of Extracurricular Students

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ABSTRACT

Physical Education, Sports, and Health (PJOK) plays a crucial role in holistically developing students' cognitive, affective, and psychomotor skills. In futsal, passing skills are a fundamental technique that significantly determines the effectiveness of the game, as they serve to maintain ball possession, build attacks, and create scoring opportunities. This study aims to examine the effect of implementing futsal-based training based on small-sided games (SSG) on improving the passing skills of extracurricular students at SMP Negeri 5 Bajawa. This study used a quantitative approach with a quasi-experimental method using a Pretest–Posttest Control Group design. The sample size of 40 students was divided into 20 in the experimental group and 20 in the control group. The experimental group received game-based futsal training with modified rules to improve passing frequency and quality, while the control group received conventional drill-based training. The instrument used was a passing skills test that measured passing accuracy, consistency, and speed. The results showed that the mean score of the experimental group increased from 18.40 to 25.85, while the control group increased from 18.10 to 20.15. A paired-sample t-test showed a significant increase in both groups ($p < 0.05$), but an independent-sample t-test on the gain score showed a significant difference ($p = 0.000$), confirming the effectiveness of the game-based approach. It was concluded that the implementation of futsal-based training based on SSG significantly improved students' passing skills and is recommended as a more contextual and participatory physical education (PJOK) learning strategy.

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A. Conception and design of the study;
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INTRODUCTION

Physical Education, Sports, and Health (PJOK) is positioned as a strategic instrument within the Indonesian national education system to develop students holistically across cognitive, affective, and psychomotor domains. Contemporary pedagogical discourse emphasizes that physical education should not merely transmit technical skills, but also cultivate tactical intelligence, collaboration, self-regulation, and

decision-making capacities in authentic game contexts (Rink, 2019; Metzler, 2020; Griffin & Butler, 2020). Over the past decade, there has been a paradigmatic shift from teacher-centered, drill-dominated instruction toward student-centered, game-based learning models that are contextual, participatory, and meaningful (Light & Harvey, 2017; Hastie, Wallhead, & Ward, 2021).

Within this framework, futsal has emerged as one of the most popular game-based sports among junior high school students in Indonesia. Characterized by limited playing space, high tempo, and continuous transitions, futsal requires technical precision, rapid perception, and effective team coordination (Sarmento et al., 2018; Queiroga et al., 2023). Among the fundamental techniques, passing constitutes the core foundation of team play. Accurate and timely passing enables ball possession maintenance, offensive build-up, spatial exploitation, and goal-scoring opportunities. Conversely, poor passing accuracy leads to loss of possession, defensive vulnerability, and reduced team effectiveness.

Despite its centrality, empirical observations in extracurricular futsal programs frequently reveal suboptimal passing performance. At SMP Negeri 5 Bajawa, extracurricular futsal activities demonstrate high student participation and enthusiasm. However, internal assessments and interschool competitions indicate recurring technical deficiencies, including inaccurate short passes, improper body positioning, weak coordination between players, and limited tactical variation. These problems suggest that existing training methods may overly emphasize isolated technical repetition without sufficient contextual integration.

Several recent Indonesian studies confirm that students' passing skills often remain at moderate or low levels due to monotonous drill-based approaches that fail to simulate authentic match situations (Muhri, Anggara, & Perdinanto, 2024; Harnanda, Septi, & Sholeh, 2024). Excessive reliance on decontextualized drills may reduce skill transferability to real-game scenarios, as students practice technique without simultaneous tactical decision-making. Consequently, there is a pressing need to implement a futsal-based training model that systematically integrates technical, tactical, physical, and psychological dimensions to enhance passing skills effectively.

Game-based learning models have been widely advocated in international sport pedagogy literature. The Teaching Games for Understanding (TGfU) framework proposes that tactical awareness should precede technical refinement, enabling students to understand "why" before mastering "how" (Griffin & Butler, 2020). Empirical studies demonstrate that TGfU enhances decision-making quality, skill execution effectiveness, and tactical awareness in invasion games (Hastie et al., 2021; Light & Harvey, 2017).

In futsal and football contexts, Small-Sided Games (SSG) represent a prominent implementation of game-based pedagogy. By reducing player numbers and modifying pitch dimensions, SSG increases ball contacts, accelerates decision-making, and simultaneously develops technical and physical capacities (Sarmento et al., 2018; Ward & Meijer, 2021). Recent studies show that SSG significantly improves passing accuracy, movement coordination, and tactical adaptability among youth players (Ansori,

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Hermawan, & Sonjaya, 2025; Al Fian, Sudarmono, & Annas, 2024; Arifin, Siswoyo, & Sulistianta, 2024; Setiawan et al., 2025). Yunita and Darmawan (2024) further report that SSG enhances endurance and active engagement during training sessions.

Beyond SSG, cooperative learning models contribute to the development of teamwork and collective responsibility. Johnson and Johnson (2019) argue that structured positive interdependence enhances motor skill acquisition and social cohesion. Branta et al. (2020) confirm that cooperative approaches in sports learning increase communication quality and shared tactical understanding. Problem-Based Learning (PBL) has also gained attention in sports education. By exposing students to game-related challenges requiring analysis and solution strategies, PBL stimulates cognitive engagement and contextual skill application (Thompson & Lee, 2024). Research indicates that integrating PBL into invasion games improves both technical execution and strategic decision-making.

Indonesian empirical studies consistently demonstrate the effectiveness of game-based approaches in futsal skill development. Alamsyah, Prabowo, and Tahki (2023), Sagala, Afrinaldi, and Sumarno (2023), and Al-Rahmatsyah, Munar, and Hasibuan (2024) report significant improvements in passing accuracy and team coordination following structured game-based interventions. Furthermore, Amirudin, Wibowo, and Nur Muhammad (2025) highlight increased motivation and motor competence when students engage in small-format futsal games. From a systems perspective, sport performance outcomes are determined by the quality of input (students' initial abilities), the effectiveness of process (training design), and the measurement of output (performance indicators). Scientific training approaches integrate biomechanical efficiency, motor learning principles, and contextualized repetition to ensure optimal skill transfer (Smith & Williams, 2021). Therefore, implementing futsal-based training grounded in game-based pedagogy represents a theoretically and empirically supported strategy to enhance passing skills.

Although numerous studies validate the effectiveness of game-based learning and SSG in improving technical skills, several limitations remain. First, most existing research is conducted at the senior high school level or within specialized sports academies. Empirical evidence focusing on junior high school extracurricular contexts, particularly in rural or semi-urban areas, remains limited. Second, many studies emphasize general skill improvement without specifically isolating passing as a primary performance indicator. Given that passing constitutes the structural backbone of futsal gameplay, focused investigation on its enhancement through systematic futsal-based training is warranted. Third, contextual variability is often overlooked. School-specific characteristics such as facility limitations, student background, and coaching style may influence the effectiveness of training models. To date, no published study has examined the structured implementation of futsal-based passing training in extracurricular students at SMP Negeri 5 Bajawa. Fourth, while game-based learning is theoretically robust, practical implementation frequently lacks structured progression and measurable performance indicators. There is a need for empirical validation of a systematic futsal-based training design that combines SSG principles, cooperative

interaction, and contextual tactical scenarios tailored to junior high school students. Therefore, this study addresses a significant empirical and contextual gap by investigating how structured futsal-based training can enhance passing skills among extracurricular students in a specific junior high school setting.

This study aims to analyze the effectiveness of implementing a futsal-based training model in enhancing passing skills among extracurricular students at SMP Negeri 5 Bajawa. Specifically, the research seeks to: Examine changes in passing accuracy and consistency following structured futsal-based training. Analyze improvements in coordination and tactical decision-making related to passing execution. Evaluate the integration of technical and tactical elements within a contextual game-based training design. The novelty of this study lies in several aspects. First, it provides empirical evidence from a junior high school extracurricular setting in Bajawa, an area underrepresented in current literature. Second, it focuses explicitly on passing skills as a central technical variable within futsal performance. Third, it integrates game-based learning principles particularly SSG, cooperative interaction, and contextual decision-making into a structured training model adapted to school-level conditions.

By combining theoretical foundations from TGfU and contemporary game-based pedagogy with localized empirical implementation, this research contributes to the advancement of sport pedagogy literature in Indonesia. Furthermore, it offers practical implications for PJOK teachers and extracurricular coaches seeking evidence-based strategies to enhance futsal performance. In conclusion, the implementation of a structured futsal-based training model is expected not only to improve passing skills but also to strengthen students' tactical awareness, teamwork, and engagement. This study thus aligns with the broader objective of PJOK to foster holistic student development through scientifically grounded and contextually relevant sports education practices.

METHODS

This study used a quantitative approach with a quasi-experimental method to empirically test the effectiveness of futsal-based training on improving passing skills through objective measurements and statistical analysis (Creswell & Creswell, 2018; Ary et al., 2019). The design used was a Pretest–Posttest Control Group Design, which allows researchers to compare changes before and after treatment and evaluate differences in effectiveness between groups (Fraenkel, Wallen, & Hyun, 2019). This design is also widely used in sports intervention research to examine the impact of training programs on technical skills (Sarmento et al., 2018; Ward & Meijer, 2021).

Table 1.
Research Design

Group	Pretest	Treatment	Posttest
Experimental	O1	X	O2
Control	O1	–	O2

The study was conducted at SMP Negeri 5 Bajawa during a six-week futsal extracurricular activity (12 sessions, each lasting 90 minutes). The session structure

included a 15-minute warm-up, game-based core exercises (60 minutes), and a 15-minute cool-down. The training model for the experimental group integrated Small-Sided Games (SSG), which have been shown to improve ball touch, passing accuracy, and decision-making (Hastie et al., 2021; Ansori et al., 2025).

The study population consisted of all 40 students participating in the futsal extracurricular activity at SMP Negeri 5 Bajawa during the current academic year. The sampling technique used was total sampling, as the entire population was used as research subjects (Sugiyono, 2022). The subjects were then divided into two groups (20 students each) using a matching technique based on pretest scores, followed by random assignment to minimize bias due to initial ability (Field, 2018).

The independent variable was the implementation of futsal-based training based on the SSG with modified rules (two-touch maximum, passing target zone, combination passing point system, and time limit on possession). This model aligns with the TGfU approach and contextual game pedagogy (Griffin & Butler, 2020; Light & Harvey, 2017). The dependent variable was passing skills, including accuracy, consistency, and speed of execution, which are key indicators of futsal performance (Queiroga et al., 2023). The control group received conventional training based on static drills (partner passing and line passing), without the integration of complex game situations. The duration and frequency of training were the same to maintain the internal validity of the study (Thomas, Nelson, & Silverman, 2022).

The research instrument used the Futsal Passing Skills Test, which measures the number of accurate passes to a five-meter target within 30 seconds. Each student received two attempts, and the highest score was used as the research data. This instrument measures accuracy and consistency, according to standards for measuring technical skills in invasive sports (Sarmento et al., 2018). Validity was tested using Product Moment correlation and declared valid if the calculated r > table r at $\alpha = 0.05$ (Field, 2018). Reliability was tested using Cronbach's Alpha with a criterion of ≥ 0.70 (Taber, 2018).

Table 2.
Research Variables and Instruments

Variables	Indicators	Instrument	Score
Implementation of Futsal-Based Training	Passing frequency, tactical variation	Structured SSG Program	-
Passing Skills	Accuracy, consistency, speed	30-Second Passing Test	Number of passes on target

Data collection was conducted through: pretest and posttest passing skills, observation of practice activities, and documentation of research activities. This approach aligns with performance-based physical education intervention research standards (Hastie et al., 2021; Ward & Meijer, 2021).

Data were analyzed using inferential statistics with the aid of statistical software. The analysis steps included: (1) Normality Test (Kolmogorov–Smirnov) – Data were considered normal if Sig. > 0.05 (Field, 2018); (2) Homogeneity Test (Levene's Test) – Data were considered homogeneous if Sig. > 0.05, (3) Paired Sample t-test – Tests intra-group improvement, and (4) Independent Sample t-test – Compares improvement between

groups. The decision-making criterion was Sig. <0.05, H_1 is accepted and H_0 is rejected, indicating a significant effect of futsal-based training implementation on improving passing skills (Thomas et al., 2022).

RESULTS AND DISCUSSION

Result

Descriptive analysis was conducted to provide an overview of the passing skill scores before (pretest) and after (posttest) treatment in the experimental and control groups. Parameters analyzed included the mean, standard deviation (SD), minimum, and maximum scores.

Table 3.
Descriptive Statistics of Passing Skill Scores

Group	Test	N	Mean	SD	Min	Max
Experimental	Pretest	20	18.40	2.31	14	22
Experimental	Posttest	20	25.85	2.67	21	30
Control	Pretest	20	18.10	2.45	14	22
Control	Posttest	20	20.15	2.58	16	24

Based on Table 2, the pretest averages for the experimental group (18.40) and the control group (18.10) indicate relatively balanced initial abilities. After 12 training sessions, the posttest average for the experimental group increased to 25.85, while the control group's score increased to 20.15. The average gain score for the experimental group was 7.45 points, while the control group's score was only 2.05 points. Descriptively, the implementation of futsal-based training based on small-sided games (SSG) provided significantly greater improvement than conventional methods.

Before conducting the hypothesis test, the data was first tested to ensure it met the parametric statistical assumptions, namely normality and homogeneity.

Table 4.
Normality Test Results (Kolmogorov-Smirnov)

Group	Test	Sig.	Description
Experimental	Pretest	0.200	Normal
Experimental	Posttest	0.200	Normal
Control	Pretest	0.187	Normal
Control	Posttest	0.164	Normal

Table 5.
Homogeneity Test Results (Levene's Test)

Data	Sig.	Description
Pretest	0.721	Homogeneous
Posttest	0.653	Homogeneous

The significance values for the pretest (0.721) and posttest (0.653) were > 0.05, indicating homogeneity of variance between groups. With the assumptions of normality and homogeneity met, the analysis could proceed using parametric tests.

This test was conducted to determine improvements in each group before and after treatment.

Table 6.
Paired Sample t-test Results

Group	Mean Difference	t-value	Sig. (2-tailed)	Description
Experimental	7.45	14.82	0.000	Significant
Control	2.05	4.21	0.001	Significant

The results showed that the experimental group experienced a highly significant improvement ($p = 0.000 < 0.05$). The control group also experienced a significant improvement ($p = 0.001 < 0.05$), but with a much smaller mean difference. This indicates that conventional training still has an effect, but its effectiveness is not as strong as the SSG-based futsal approach.

This test was conducted to determine whether there was a difference in improvement between the two groups.

Table 7.
Independent Sample t-test on Gain Scores

Variable	Experimental Mean	Control Mean	t-value	Sig. (2-tailed)	Description
Gain Score	7.45	2.05	9.63	0.000	Significant

A significance value of 0.000 (<0.05) indicates a significant difference in improvement between the experimental and control groups. A t-value of 9.63 indicates a statistically very strong difference.

Overall, the results of this study indicate that the implementation of futsal-based training based on small-sided games is significantly more effective in improving passing skills than conventional drill methods.

The 7.45-point increase in the experimental group indicates that the small-sided games approach can improve accuracy, consistency, and speed of decision-making in real-life game situations. Therefore, the alternative hypothesis (H_1) is accepted, and the null hypothesis (H_0) is rejected. The implementation of futsal-based training has been shown to have a significant impact on improving the passing skills of extracurricular students at SMP Negeri 5 Bajawa.

Discussion

The results of the study indicate that the implementation of futsal-based training based on small-sided games (SSG) significantly improved the passing skills of extracurricular students at SMP Negeri 5 Bajawa. This finding is supported by the increase in the experimental group's average score of 7.45 points compared to the control group's 2.05 points, as well as statistical test results showing a significant difference at the 0.05 level. Methodologically, the equivalence of pretest scores between the two groups strengthens the study's internal validity, as changes in the posttest can be directly attributed to the treatment (Fraenkel et al., 2019; Field, 2018).

Empirically, the effectiveness of the SSG approach aligns with various recent studies showing that game-based learning is superior to traditional drill methods in improving technical skills in invasive sports (Hastie, Wallhead, & Ward, 2021; Light & Harvey, 2017; Griffin & Butler, 2020). In the context of futsal, Sarmento et al. (2018) and

Queiroga et al. (2023) emphasized that passing is a tactical foundation that determines the effectiveness of team play. Significant improvements in the experimental group indicate that the 3v3 and 4v4 game contexts provide a higher frequency of ball touches, thereby accelerating neuromotor adaptation and perception-action coordination.

These results are consistent with research by Ansori, Hermawan, and Sonjaya (2025), Al Fian, Sudarmono, and Annas (2024), and Arifin, Siswoyo, and Sulistianta (2024), which reported that SSG significantly improved passing accuracy and decision-making quality. Setiawan et al. (2025) also emphasized that the small-game format increased student active engagement by 30–40% compared to static drills. In this study, the game's dynamics, with its two-touch limit and point system for combined passing, encouraged students to think quickly and execute passes accurately under pressure from space and time, in line with the principles of a constraint-led approach in modern sports pedagogy (Davids et al., 2017; Renshaw & Chow, 2019).

From a pedagogical perspective, a game-based approach allows for the integration of technical, tactical, and cognitive aspects into a single, integrated activity (Metzler, 2020; Ward & Meijer, 2021). Unlike drill methods that focus on mechanical repetition, SSG presents complex, real-life game situations. This reinforces the principle of transfer of learning, where skills learned in authentic contexts are more easily applied in real matches (Schmidt & Lee, 2019). The significant improvement in the experimental group supports the specificity of practice theory, which states that training that mimics competitive conditions results in more effective skill transfer (Thomas, Nelson, & Silverman, 2022).

Although the control group also showed significant improvements, the magnitude was smaller. This indicates that conventional drill methods still contribute to improving basic accuracy, as Bompa and Buzzichelli (2019) argued, stating that technical repetition is still necessary for developing motor foundations. However, without the integration of tactical context and decision-making, their effectiveness in real-game situations is limited (Hastie et al., 2021). In other words, drills improve "how to pass," but SSG improves "how, when, and why to pass."

Psychologically, game-based learning increases students' intrinsic motivation and emotional engagement. During the treatment process, students in the experimental group demonstrated more active team communication, high enthusiasm, and consistent participation. This aligns with the findings of Amirudin, Wibowo, and Nur Muhammad (2025), who stated that SSG significantly improves the motivation and motor competence of junior high school students. Johnson and Johnson (2019) and Branta et al. (2020) added that cooperative interactions in sports learning strengthen collective responsibility and team cohesion, which positively impact the quality of technical performance.

Within the framework of motor learning theory, significant improvements in the experimental group can be explained through the integration of perception, decision-making, and movement execution within a continuous cycle (Schmidt & Lee, 2019). This approach supports ecological dynamics theory, which emphasizes the interaction between the individual, the task, and the environment (Davids et al., 2017). In SSG,

students not only execute passing techniques but also read the space, analyze the movements of teammates and opponents, and choose the best option in real time. This process accelerates the formation of stable, adaptive movement patterns.

The results of this study are also consistent with various national studies indexed by SINTA. Alamsyah, Prabowo, and Tahki (2023), Sagala, Afrinaldi, and Sumarno (2023), and Al-Rahmatsyah, Munar, and Hasibuan (2024) reported significant improvements in passing skills through a modified game approach at the junior and senior high school levels. Research by Yunita and Darmawan (2024) even showed that SSG not only improves passing accuracy but also students' endurance capacity and activity intensity during training.

The practical implications of these findings are highly relevant for physical education teachers and extracurricular coaches. The SSG-based futsal training model can be implemented without the need for complex facilities, simply by modifying the number of players, field size, and game rules. This approach aligns with the characteristics of junior high school students, who tend to prefer dynamic, competitive, and collaborative activities (Metzler, 2020). Therefore, implementing this model not only improves technical skills but also develops students' social and affective aspects.

However, this study has limitations. The relatively short intervention duration (six weeks) may not reflect long-term effects on skill stability. Furthermore, the sample size was limited to a single school, so the generalizability of the results requires broader study. Further research with a longitudinal design, larger sample size, and the integration of biomechanical analysis or GPS tracking is recommended to enrich the empirical evidence (Ward & Meijer, 2021; Queiroga et al., 2023).

Overall, the results of this study confirm that the implementation of futsal-based training based on small-sided games is more effective than conventional methods in improving the passing skills of extracurricular students at SMP Negeri 5 Bajawa. The integration of technical, tactical, cognitive, and motivational aspects within a single game activity is a key factor in the success of this approach. These findings reinforce the modern physical education paradigm that emphasizes contextual and meaningful learning as the primary strategy in developing students' sports skills.

CONCLUSION

Based on the research results and statistical analysis, it can be concluded that the implementation of futsal-based training using a small-sided games (SSG) approach significantly improved the passing skills of extracurricular students at SMP Negeri 5 Bajawa. Descriptively, the mean pretest scores of the experimental group (18.40) and the control group (18.10) were relatively balanced, indicating equivalent initial abilities. After 12 treatment sessions, the posttest mean for the experimental group increased to 25.85 with a gain score of 7.45 points (high category), while the control group increased to 20.15 with a gain score of 2.05 points (moderate category).

The paired sample t-test results showed significant improvements in both groups ($p < 0.05$), but the experimental group's improvement was significantly greater. An

independent sample t-test on the gain score yielded a significance value of 0.000 (< 0.05), confirming a significant difference in improvement between the two groups.

Conceptually, the SSG approach is effective because it increases the frequency of ball touches, active engagement, decision-making, and motor execution accuracy in real-life game situations. Thus, this model is recommended as a contextual, participatory, and effective learning strategy in improving basic futsal technical skills, especially passing, both in extracurricular activities and PJOK learning.

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