Effects of Varied Training on Passing Coordination in Futsal Among Extracurricular Students at SMP Bina Satria Mulia, Medan

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Abstract.

Background *Futsal passing coordination is a fundamental technical skill that supports effective team play and ball distribution. Preliminary observations at SMP Bina Satria Mulia, Medan, showed that students' passing performance in extracurricular futsal activities had not yet reached the expected standard. Of the 32 students participating in the programme, only 18 were able to meet the minimum passing accuracy criterion during controlled practice.*

Objectives *This study aimed to determine the effect of varied training on futsal passing coordination among students participating in the extracurricular programme at SMP Bina Satria Mulia, Medan.*

Methods This study employed a quantitative experimental approach using a one-group pre-test and post-test design. The population consisted of all students involved in the futsal extracurricular programme, and 32 students were selected as the sample through total sampling. Data were collected using a passing accuracy test administered from a distance of 10 metres toward a 1-metre-wide target. The data were analyzed using a paired-samples t-test with a significance level of 0.05.

Results *The results showed that the difference between pre-test and post-test scores was not statistically significant ($t = 1.978$, $p = 0.062$). However, the mean score increased from 5.45 in the pre-test to 6.05 in the post-test, indicating an average improvement of 0.60 points. Furthermore, the effect size calculated using Cohen's d was 0.442, which is classified as a medium effect. These findings indicate that varied training contributed to a practically meaningful improvement in futsal passing coordination, although the increase did not reach statistical significance.*

Conclusion *Varied training showed a positive tendency in improving futsal passing coordination among extracurricular students at SMP Bina Satria Mulia, Medan. Although the improvement was not statistically significant, the medium effect size suggests practical value. Further studies with larger samples, longer intervention periods, and more rigorous research designs are recommended to provide stronger evidence of training effectiveness.*

Keywords: Varied Training; Passing Coordination; Futsal; Extracurricular Students; Junior High School

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INTRODUCTION

Futsal has seen significant growth over the past two decades, not only at international level but also in Indonesia. According to FIFA data (2024), futsal is now played in over 130 countries, with the number of registered players reaching 60 million worldwide. In Indonesia itself, based on data from the Indonesian Futsal Association (AFI, 2023), the number of futsal players has reached over 2 million, with 30% of them being school-age players. This growth is supported by the dynamic nature of futsal, which requires high technical skills and can be played in relatively confined spaces.

Based on systematic observations carried out between August and December 2024 and in-depth interviews with the coaching team, various challenges were identified in the coaching process, particularly regarding the development of basic futsal skills. Skills assessment data indicates that of the 45 pupils actively participating in the futsal extracurricular programme, only 18 pupils (40%) were able to perform passes with an accuracy level meeting the minimum standard (a 75% successful passing rate in controlled training situations). An in-depth analysis of this issue revealed several critical factors. Firstly, based on biomechanical studies conducted by Thompson and Garcia (2024), passing in futsal requires more precise coordination compared to conventional football, given the smaller ball size and flatter playing surface. Secondly, neurophysiological research by Yamamoto et al.

The Indonesian Futsal Coaches Association (APFI, 2024) recommends, in its "Guide to Youth Player Development", an adaptive and progressive training approach, with a particular emphasis on training variety for players aged 12–15. These recommendations are based on a comprehensive analysis of futsal development programmes in various Asian countries, including Thailand, Iran and Japan, which have successfully produced high-quality players through the application of varied training methods from an early age.

Based on the comprehensive discussion above, there is an urgent need to conduct a more in-depth study on the impact of varied training on improving passing coordination in futsal, particularly among students at Bina Satria Mulia Junior High School in Medan. This study not only aligns with recommendations from various national and international futsal bodies, but is also grounded in real-world needs on the ground, supported by the latest scientific findings. It is hoped that the results of this research will make a significant contribution to the development of more effective and efficient training methods to improve the quality of futsal coaching at junior high school level, as well as serving as a reference for the development of similar programmes in other educational institutions. and speed, passing drills using specific targets, passing drills in game situations, as well as various forms of coordination exercises integrated with passing techniques.

Based on the above discussion, the researchers consider it necessary to conduct a more in-depth study on the impact of varied training on improving passing coordination in futsal, particularly among students at Bina Satria Mulia Junior High School in Medan. This research is in line with the recommendations of the Indonesian Futsal Coaches Association (APFI, 2024) regarding the importance of developing adaptive and progressive training methods for young players. This study is expected to make a significant contribution to the development of more effective and efficient training methods to improve the quality of futsal coaching at junior high school level.

METHOD

Research Design

The type of research in this study is quantitative, employing an experimental method. According to Suharsimi Arikunto (2010:9), the experimental method is a way of identifying a cause-and-effect relationship (causal relationship) between two factors deliberately introduced by the researcher, whilst analysing, reducing or controlling for other confounding factors. From the above definition, it can be concluded that the experimental research method is part of quantitative methods and has its own distinctive characteristics, involving the application of a treatment aimed at determining the effect of the independent variable (treatment) on the dependent variable. This study will describe the extent of the influence of the independent variable (treatment) – passing drills using a playing model – on the dependent variable (Y) – passing skill outcomes. In experimental research, a researcher must, as far as possible, ensure that any variation or change in the dependent variable is genuinely caused by manipulation of the independent variable. This is what is referred to as internal validity, where control mechanisms become of paramount importance.

This study is an experimental study using a One-Group Pre-test and Post-test design, i.e. there is no control group. According to Sugiyono (2013: 110), the One-Group Pre-test and Post-test Design ( ) is a research design that involves a pre-test before the treatment is administered; consequently, the results of the treatment can be determined more accurately as they can be compared with the situation prior to the treatment. Thus, the sequence in this research design involves an initial test, known as a pre-test, to determine the players' initial ability.

In the Pre-test–Post-test Control Group Design, two groups are selected at random and then given a pre-test to determine the initial condition and whether there is a difference between the experimental group and the control group. The pre-test results are considered good if there is no significant difference in the scores of the experimental group (Sugiyono, 2012: 113). In this Pre-test–Post-test Control Group Design, two classes are selected at random. These two classes are the control class and the experimental class. They are then given a pre-test to determine the initial condition and whether there is a difference between the experimental group and the control group. After the pre-test has been administered, the treatment is given to the experimental class. Finally, a

post-test is conducted for both classes. Finally, the two classes are compared (Alfianika, 2018: 133).

The research procedure involving varied passing drills was carried out over 18 sessions. The first session was preceded by a pre-test, the subsequent sessions involved a training programme consisting of varied passing drills, and a post-test was conducted at the end of the sessions.

1. *Initial test (pre-test)*
   The players' passing ability was assessed before the training programme began. The purpose of the pre-test was to determine each player's initial passing ability before the training programme was implemented.
2. *Training Activities*
   This training session is conducted in three stages, namely: 1) Warm-up: before the warm-up, the athletes are led in prayer, followed by an introduction to the types of exercises to be performed. The warm-up exercises included: stretching, flexibility exercises and strengthening exercises. 2) The core of this training session was a variety of passing drills. 1) Cool-down: the aim of the cool-down was to restore the athletes' condition after training; the cool-down was carried out through relaxation or stretching, an evaluation of the training session and general corrections.
3. *Final Test (Post-test)*
   Following 18 treatment sessions, a final test was conducted, carried out in the same manner as the initial one.

Participant

This study was conducted at SMP Bina Satria Mulia Medan, Medan City, North Sumatra Province, and involved all active students in the futsal extracurricular programme. In this study, total sampling was used as the sample method, which is required when the population is less than 100 people. The research instruments and data analysis techniques established for this study's sample comprised all active students in the futsal extracurricular programme, totalling 32 students/players.

Data Analysis

Before testing the hypotheses, it is necessary to conduct prerequisite tests, namely normality and homogeneity of data. Before proceeding to the t-test, there is a requirement that must be met by the researcher: the data being analysed must be normally distributed; therefore, normality and homogeneity tests must be conducted (Arikunto in Kusumajati 2019: 46).

1. Prerequisite Test

1.1. Normality Test

A normality test is essentially a test to determine whether the distribution of the data to be analysed is normal. The test is conducted depending on the variables to be analysed. The normality of the data distribution is tested using the Kolmogorov-Smirnov test with the aid of SPSS 23.

1.2. Homogeneity Test

In addition to testing the distribution of the values to be analysed, a homogeneity test is required to ensure that the groups forming the sample originate from a homogeneous population. Homogeneity is assessed using the F-test on pre-test and post-test data with the aid of SPSS 23.

1.3 Hypothesis Test

Hypothesis testing was carried out using the t-test with the aid of SPSS 23, specifically by comparing the pre-test and post-test means. If the calculated t-value is smaller than the critical t-value, then the alternative hypothesis (Ha) is rejected; if the calculated t-value is greater than the critical t-value, then Ha is accepted.

To determine the percentage increase following the treatment, the percentage increase was calculated using the following formula (Sutrisno Hadi, 2011: 34).

Percentage increase = *Mean Different* x 100%

Mean Pre test Mean Different = mean post test-mean pre test.

RESULTS AND DISCUSSION

Results

The first step taken by the researcher was to identify the problem to be investigated through 'Varied Training on Futsal Passing Coordination Among Extracurricular Students at SMP Bina Satria Mulia, Medan, in 2025', examining both the participants' level of proficiency and their enthusiasm in taking part in the training. This was done to observe the changes in passing coordination during futsal matches following the training sessions.

Prior to the research, the researcher first interviewed the coach to gather information regarding the results of futsal passing coordination among extracurricular students at SMP Bina Satria Mulia, Medan, in 2025. Following this, the researcher conducted the training sessions and administered a post-test.

The steps taken prior to implementing the method involve planning the activities to be carried out through a training programme, after which the researcher proceeds with the research stages.

The stages are as follows:

1. *The researcher introduces themselves and explains the purpose and objectives of the research*
2. *The researcher explains passing techniques in futsal*
3. *The researcher explains four varied training programmes for futsal passing coordination.*
4. *After carrying out the training programme over 16 sessions, the participants undertake a post-test using a passing test instrument. Following the completion of the research, the results of the pre-test and post-test are obtained.*

To determine the effect of the research variables, a hypothesis test was conducted using the t-test formula. The results of the calculations are as follows:

Table 8. Hypothesis Testing of Passing Results Data

Variable	N	Mean	Std. Deviation	Std. Error Mean	Minimum	Maximum
Pre-test	20	5.4500	1.3219	0.2956	3	7
Post-test	20	6.0500	1.4654	0.3277	4	9
Gain Score	20	0.6000	1.3565	0.3033	-2	3

Based on the results of this study, which involved 32 subjects whose futsal passing coordination skills were assessed via pre-tests and post-tests. The results of the descriptive statistical analysis showed that the mean pre-test score was 5.45 with a standard deviation of 1.32, whilst the mean post-test score was 6.05 with a standard deviation of 1.47. There was an average increase of 0.60 points from the pre-test to the post-test, indicating a positive trend in futsal passing coordination ability following the intervention. The pre-test score range was between 3 and 7, whilst the post-test range was between 4 and 9, indicating considerable variability in the individual abilities of the research subjects. It is recommended to evaluate the intervention method used, extend the duration of the intervention, or increase the intensity of the training to achieve a more substantial improvement. Furthermore, further research with a larger sample size or a different experimental design may be required to confirm the effectiveness of the intervention in improving futsal passing coordination. Although the statistical results show no significant difference, the consistent upward trend still provides a positive indication that can be further developed.

Discussion

Based on the analysis of the paired samples t-test results in this study, there was no statistically significant difference between futsal passing coordination ability before (pre-test) and after (post-test) the intervention ($t = 1.978$, $p = 0.062 > \alpha = 0.05$). Nevertheless, there was an average increase in scores of 0.60 points from 5.45 (pre-test) to 6.05 (post-test), indicating a positive trend in futsal passing coordination ability following the intervention. This finding aligns with the research by Miftachurochmah and Sukamti

(2022), which states that coordination is an essential factor for futsal players to execute skills, movements, and strategies effectively on the pitch, as well as helping players maintain balance, control movements, and make quick decisions during the game.

Although the statistical test results did not show significance at the α = 0.05 level, the effect size calculation using Cohen's d yielded a value of 0.442, which falls within the medium effect size category according to Cohen's (1988) classification. Sullivan and Feinn (2012) emphasise that effect size helps readers understand the magnitude of the differences found, whereas statistical significance tests whether these findings are likely due to chance. Both aspects are crucial for readers to grasp the full impact of the research conducted. In the context of this study, the moderate effect size indicates that, although not statistically significant, there was a practically meaningful improvement in futsal passing coordination ability.

The findings of this study contrast with several previous studies that demonstrated significant results in improvements to futsal ability. The study conducted by Wahidi et al. (2021) on the implementation of smallsided games to enhance the aerobic capacity of female futsal players showed significant results with a t-value of 3.926 and a probability of p = 0.004 < 0.05. This difference in results may be attributed to several factors, including different types of intervention, duration of treatment, sample characteristics, and the variables measured. Barbosa et al. (2022), in their study on the effects of coordination training on futsal players, also found significant improvements, albeit with a longer duration of treatment compared to this study.

Although the research results did not show statistical significance, these findings make an important contribution to our understanding of the effectiveness of futsal passing coordination training programmes. The moderate effect size (d = 0.442) found indicates that the intervention administered has meaningful practical potential, even though it did not reach the expected level of statistical significance. This is in line with Ellis's (2010) perspective, which emphasises that practical significance and statistical significance are two distinct yet complementary concepts in the interpretation of research results.

From a practical perspective, the findings of this study can assist futsal coaches and practitioners in designing more effective training programmes by taking into account factors such as duration, intensity and optimal training methods. The study by Serrano et al. (2020) on the analysis of local positioning systems in official Spanish futsal league matches demonstrates that a thorough understanding of the physical and technical characteristics of futsal is essential for the development of training programmes that are effective.

CONCLUSION

Based on the results of data analysis, description, testing of research results, and discussion, it can be concluded that there is no statistically significant difference between futsal passing coordination ability before (pre-test) and after (post-test) the intervention at a significance level of α = 0.05. The results of the paired samples t-test yielded a calculated t-value of 1.978 with a p-value of 0.062, which is greater than the set α value (0.05), meaning the null hypothesis (H_0) could not be rejected.

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AUTHOR CONTRIBUTION STATEMENT

This study was conceptualised and designed by Faltwelveman Bu'ulolo, who developed the research objectives and methodology, managed data collection, coordinated with participants, and supervised fieldwork at STOK Bina Guna in Medan. Devi Catur Winata carried out the data analysis, interpreted the findings, and made a significant contribution to the drafting of the manuscript. All authors participated in revising the manuscript, approved the final version for submission, and take full responsibility for the integrity and accuracy of the work.

CONFLICT OF INTEREST AND FUNDING

The authors declare no conflict of interest related to the conduct, authorship, or publication of this study.

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