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The Effect of Variation-based Shadow Badminton Training on Improving Footwork Ability

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ABSTRACT

Problem: The low footwork skills of students are inextricably linked to the training methods employed in the learning process. Footwork training in badminton lectures has generally been conducted conventionally, involving monotonous repetition of basic movements, lacking variety, and providing minimal movement stimuli that mimic real-life playing conditions. **Purpose:** This study aims to determine the effect of variation-based shadow badminton training on improving the footwork abilities of Sports Education students. **Methods:** The study used an experimental method with a pretest–posttest control group design. The research sample consisted of 90 students, divided into two groups: the experimental group (n = 45) and the control group (n = 45). The experimental group was given a variety of shadow badminton training, while the control group received conventional training. The research instrument used a nationally and internationally validated badminton footwork ability test. Data analysis was performed using normality tests, homogeneity tests, and independent sample t-tests with a significance level of 0.05. **Results:** The results of the study showed that there was a significant increase in footwork ability in both groups ($p < 0.05$), but the increase in the experimental group was significantly higher than the control group ($p = 0.000$). **Conclusion:** These findings indicate that variation-based shadow badminton training significantly improves students' footwork skills. Therefore, variation-based shadow badminton training is recommended as an effective training method for improving the quality of badminton instruction in higher education.

Keywords: badminton, shadow, footwork.

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Introduction

Badminton is a sport that requires mastery of technical skills, physical condition, and high levels of motor coordination and requires neuronal modulation. (Liu et al., 2026; Skrzeba & Vogt, 2018; Zhou et al., 2025). A player's success in badminton is not only determined by the ability to hit the shuttlecock, but is also greatly influenced by the ability to move effectively and efficiently throughout the court area. (Aziz et al., 2020; Boroujeni & Shahbazi, 2011; Doron et al., 2020; Robiatun Batubara, Bafirman Bafirman, Asep Sujana Wahyuri, Nurul Ihsan, 2024). One of the basic components that really determines the quality of a badminton game is footwork, namely the ability to move the feet quickly, precisely and in balance to reach every direction of the opponent's shot (Phomsoupha & Laffaye, 2015)

In the context of higher education, particularly in badminton courses in the Sports Education Study Program, students' footwork skills are a fundamental aspect that must be mastered from the beginning. Good footwork allows students to be in optimal position when hitting, maintain body balance, and improve the effectiveness of their hitting technique (Bharadwaj & Srinivasa, 2026; Deng et al., 2024) . However, initial observations in badminton lectures indicate that most students still struggle with fast, coordinated footwork. They tend to be slow to respond to the shuttlecock's direction, delayed in reaching the ball's impact point, and less able to maintain balance when changing positions. This condition impacts the quality of their shot technique and the overall effectiveness of their game.

The problem of students' poor footwork skills is inextricably linked to the training methods applied in the learning process. To date, footwork training in badminton lectures has generally been conducted

conventionally, involving monotonous repetition of basic movements, lacking variety, and providing minimal movement stimuli that mimic real-life playing conditions. This training method tends to decrease learning motivation, limit movement exploration, and is less effective in developing students' reaction speed and accuracy. Therefore, a more innovative, systematic, and contextual training approach is needed to maximize footwork development.

One training method considered effective for improving footwork is shadow badminton. Shadow badminton is a form of training without a shuttlecock that emphasizes simulating footwork and body positioning in accordance with the playing pattern of badminton (Ihsan et al., 2024; Nirendan, n.d.). This exercise allows players to focus on coordination, speed, and stride efficiency without being distracted by stroke technique. Several international studies have reported that shadow badminton training can improve a player's speed, agility, and movement efficiency (Kuntze et al., 2010; Phomsoupha & Laffaye, 2015). However, in the context of learning in higher education, the implementation of shadow badminton training still tends to be carried out simply and lacks variety.

Developing variation-based shadow badminton training is a strategic alternative in badminton learning. Variations in training, including changes in direction, tempo, stride patterns, and movement stimuli, are believed to increase student engagement, enrich movement experiences, and optimize neuromuscular adaptation. Several national studies have shown that footwork training with movement variations can significantly improve badminton skills (Subarjah, 2001; Saputra & Badruzaman, 2020). However, research that specifically examines the influence of variation-based shadow badminton training on students' footwork abilities in badminton courses is still relatively limited, especially in the context of sports education in higher education.

Based on this study, there is a research gap between the importance of footwork mastery in badminton learning and the limited number of experimental studies testing the effectiveness of variation-based shadow badminton training on students. Most previous research has focused on athletes or competitive players, while studies in the context of student learning are still suboptimal. Therefore, experimental research is needed to systematically examine the effect of variation-based shadow badminton training on improving students' footwork abilities.

Based on the description, this study aims to empirically test the effect of variation-based shadow badminton training on improving footwork ability in Physical Education students. The test was conducted using a quasi-experimental pretest–posttest design by comparing changes in footwork ability between the experimental group that received variation-based shadow badminton training and the control group that received conventional footwork training.

Method

This type of research is quantitative with a comparative quasi-experimental design (comparative quasi-experimental design) (de Oliveira Almeida, 2026; Jiang et al., 2026). This design was chosen because the researchers could not fully randomize the subjects, but they could still objectively compare the effects of the treatment between the experimental and control groups. The researchers divided the study subjects into two groups, group division was carried out using a matching technique based on the pre-test footwork ability scores. The pre-test scores were then sorted from highest to lowest (or vice versa) and paired into pairs with equal initial abilities (pair-matching). In each pair, one participant was placed in the experimental group and one participant in the control group alternately, so that the initial characteristics of both groups were relatively balanced. The experimental group was given shadow badminton training based on a variety of training programs implemented for 8 weeks with a frequency of 2 sessions per week. Each session lasted 60 minutes, consisting of a warm-up (±10–15 minutes), core exercises (±30–40 minutes), and a cool-down (±5–10 minutes). The entire training series was conducted on the campus badminton court and guided by the same instructor to maintain consistency of treatment in both groups, while the control group was given conventional badminton training. The research design can be described as follows; The sample in this study was 90 students from Padang State University majoring in Sports Education who were taking a badminton course. Furthermore, the characteristics of the subjects in this study were 1) Active students in semesters three to five, 2) Have basic experience playing badminton, 3) be in the age range of 19-23 years, 4) Be in good health and have no injuries to the lower extremities.

The test instrument used in this study was the Badminton Floorwork Test (6- direction movement test) (Phomsoupha & Laffaye, 2015b), which measures the speed and accuracy of foot movement towards several points on the field. The test is conducted on a standard badminton court. Before the test begins, participants receive an explanation and demonstration of the movements by the examiner, then perform a warm-up and a trial run to ensure they understand the procedure. Footwork ability scores are determined

based on the test completion time (in seconds) measured using a stopwatch. Timing begins when the "start" command is given and stops when the participant completes the entire six-way sequence and returns to the base position at the end of the sequence. The data analysis technique used was the Independent Sample T-test to compare the experimental and control groups. The steps in the analysis are as follows: 1) Data normality test using Shapiro-Wilk. The normality test aims to determine whether the data obtained is normally distributed or not, 2) to see the comparison between the two groups using the Independent Sample t-test.

Results

The research data were obtained from a badminton footwork ability test conducted before (pretest) and after (posttest) the treatment. The research subjects were 90 students, divided into two groups: the experimental group (n = 45) and the control group (n = 45). Statistical descriptions of the pretest and posttest results of footwork ability are presented in Table 1.

Table 1. Data description

Group	N	Pretest	Posttest
Experiment	45	18,46	14,21
Control	45	18,39	16,88

Based on Table 1, it can be seen that there was a significant decrease in travel time in the experimental group after being given variation-based shadow badminton training. Meanwhile, the control group also experienced an increase in footwork ability, but at a lower rate than the experimental group.

Before hypothesis testing is carried out, normality and homogeneity tests are first carried out as prerequisites for parametric analysis.

Table 2. Normality Test

Group	Pretest	Posttest
Experiment	0,172	0.204
Control	0,185	0,196

The results of the normality test show that all data have a significance value (p) > 0.05, so it can be concluded that the data is normally distributed.

Table 3. Homogeneity Test

Variable	Sig
Footwork	0,421

A paired sample t-test was conducted to determine the differences in footwork ability before and after treatment in each group.

Table 5. Uji Independent T-test

Group	Maen	t	sig
Experiment	4,25	13,74	0,000
Control	1,51	6,02	0,000

The results of the paired sample t-test showed a significant increase in footwork ability in both the experimental and control groups (p < 0.05). However, the increase in the experimental group was significantly greater than in the control group..

Discussion

The results of the study showed that variation-based shadow badminton training significantly improved students' footwork skills. This finding was evidenced by a higher posttest score in the experimental group compared to the control group, as well as statistical test results showing a significant difference ($p < 0.05$). This indicates that variations in shadow badminton training can improve the effectiveness of footwork learning in badminton courses.

Theoretically, the results of this study are in line with the opinion (Lees, 2003; Phomsoupha & Laffaye, 2015) which states that footwork is a fundamental component in badminton because it determines the quality of body position, balance, and shot effectiveness. Shadow badminton training combined with variations in direction, tempo, and stride patterns can optimally stimulate the neuromuscular system, thereby accelerating movement adaptation and improving footwork coordination. Thus, students become more responsive to changes in direction of movement, more efficient in changing positions, and more stable in maintaining body balance.

The significant improvement in footwork skills in the experimental group was also influenced by the implementation of varied exercises that required students to continuously adapt to changing movement patterns. Variation in exercises plays a crucial role in preventing boredom, increasing learning motivation, and enriching students' motor skills (Fitrah et al., 2024; Yohanes & Komaini, 2021). This is in line with the principles of motor learning which emphasize the importance of varied practice in improving skill retention and transfer of motor abilities to real game situations (Burchartz et al., 2020). Through variations of shadow badminton training, students not only memorize step patterns, but also learn to flexibly adjust their movements according to the demands of the game situation.

The findings of this study are also consistent with the results of previous research (Kuntze et al., 2010) which states that footwork training with the right intensity and variation can increase movement efficiency, reduce reaction time, and improve step mechanics in badminton. In addition, national research by (Malwanage et al., 2022) reported that structured and systematic footwork training significantly improved badminton skills. Thus, the results of this study further strengthen the empirical evidence that variation-based shadow badminton training is an effective method for improving footwork skills, particularly in the context of student sports education.

Compared to conventional training which tends to be monotonous and focuses on repeating basic movements, variation-based shadow badminton training provides a richer and more contextual learning stimulus (Ghosh et al., 2022). Students are required to move quickly in various directions, regulate their pace, and maintain dynamic body balance. These conditions mimic real-life game situations, maximizing the transfer of skills from training to performance. This explains why the experimental group's footwork performance improved significantly compared to the control group.

From a pedagogical perspective, the results of this study have important implications for the badminton learning process in higher education. The implementation of variation-based shadow badminton training not only contributes to improving students' psychomotor skills but also enhances cognitive and affective aspects, such as understanding movement patterns, concentration, and learning motivation. Therefore, lecturers are advised to systematically integrate variations of shadow badminton training into their learning plans to optimally achieve the objectives of badminton lectures.

Although this study shows positive results, there are several limitations that need to be considered. This study only involved a limited number of students and was conducted over a limited period of time, so the generalizability of the results still needs further study. Furthermore, this study only focused on footwork variables, so the effect of variation-based shadow badminton training on other technical skills, such as smashes, drop shots, and clears, cannot be comprehensively explained. Therefore, further research is recommended to involve a larger sample size, longer training duration, and examine the effect of this training method on various badminton technical skills.

Conclusion

Based on the research results, it can be concluded that variation-based shadow badminton training has a significant effect on improving students' footwork abilities in badminton courses, as demonstrated by improvements in movement performance in the form of speed, accuracy, and efficiency of footwork after

treatment. Variations in training involving changes in direction, tempo, step patterns, and movement stimuli have been shown to optimally improve neuromuscular adaptation, movement coordination, and motor responses of students compared to conventional training methods. These findings indicate that the application of variation-based shadow badminton training is not only effective in improving psychomotor aspects, but also contributes to improving the quality of the badminton learning process as a whole. Therefore, this training method is recommended to be systematically integrated into badminton lectures at universities as an innovative, applicable learning strategy oriented towards improving students' basic skills.

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Conflicts of Interest

The authors declare no conflict of interest.

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