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The Effectiveness of Badminton Learning Through the Badminton Stroke Technique Learning Method for Students of Universitas Bung Hatta

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ABSTRACT

This study aims to evaluate the effectiveness of badminton instruction through a more engaging and interactive badminton stroke technique learning method for students at Universitas Bung Hatta, Padang, during the 2023-2024 academic year. **The research employed** an experimental design with pre-test and post-test assessments, involving 14 students from the Physical Education, Health, and Recreation Study Program enrolled in the badminton course. The instruments used in this study included practical skill tests and theoretical tests to measure the students' learning outcomes before and after the implementation of the more engaging and interactive badminton stroke technique method. **The results indicated** that the average pre-test score was 80.14, with a standard deviation of 4.13, while the average post-test score was 81.27, with a standard deviation of 3.95. This reflects an increase of 1.13 points (1.41%) in the students' average score after the intervention, demonstrating that the badminton stroke technique instruction was effective in improving the students' skills. The t-test analysis revealed that the computed t-value (3.52) was greater than the critical t-value (1.770), indicating that the research hypothesis is supported. Consequently, **it can be concluded** that the implementation of the more engaging and interactive badminton stroke technique learning method significantly enhances the effectiveness of badminton instruction for students at Universitas Bung Hatta, Padang.

Keywords : Effectiveness of learning, badminton, stroke technique, interactive

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INTRODUCTION

Badminton is one of the most popular sports, both globally and in Indonesia. In Indonesia's international participation journey, Indonesian badminton players have achieved various remarkable accomplishments, both in international open tournaments and the Olympics. Some Indonesian badminton players have even earned the title of world number one player.

As one of the most popular sports in Indonesia, badminton holds an important place in the context of physical education and competitive sports. This sport is not only widely popular among the public but has also become an integral part of the physical education curriculum, both in schools and universities. Mastery of basic badminton techniques, such as forehand, backhand, and smash, is a key factor in achieving success on the court. These techniques not only influence a player's performance but also reflect the level of technical and tactical understanding possessed by an athlete (Albayati & Kaya, 2023; Lin et al., 2023).

In general, the success of a badminton player is not only determined by physical strength or reaction speed but also by their ability to master in-depth and applicable basic techniques (Alben et al., 2023; Bompa & Carrera, 2015; Mardius & Alben, 2022; Song & Rajakani, 2022). Each shot, whether it's a forehand, backhand, or smash, requires high control over body movements and hand-eye coordination, which often need to be executed in a very short amount of time. In fast-paced and high-pressure games, the ability to perform techniques accurately and in a timely manner will greatly determine the outcome of the match (Sheng et al., 2022; K. Da Wang, 2023).

More deeply, each stroke technique plays a crucial role in the game strategy. Forehand and backhand shots allow players to manipulate the opponent's position, while the smash serves as an aggressive attack that can determine the outcome of the match. Mistakes in executing these basic techniques, even if minor, can have fatal consequences and lead to defeat. Therefore, mastering these stroke techniques with precision and consistency becomes the main focus in badminton training, especially in higher education institutions. Students, as individuals learning badminton, are not only expected to master these basic techniques but also to apply them effectively in real-game situations that are dynamic (Khaskheli et al., 2017; Liang & Tasnaina, 2023; Wang et al., 2023).

The teaching of badminton stroke techniques needs to be given careful attention, as the ability to master basic techniques is a fundamental aspect of developing quality athletes. This also requires educators to implement appropriate and effective teaching methods to ensure that students not only understand the theoretical aspects of the techniques but also can implement them well in practice. A deep understanding of these techniques will serve as a key asset for students to improve their performance, both in formal competitions and in sports education more broadly.

However, in higher education environments, including at Universitas Bung Hatta, badminton learning often faces issues with low student learning outcomes, both in mastering basic stroke techniques and in theory. Empirical data shows that students frequently encounter difficulties in correctly implementing stroke techniques and understanding the theories presented. This is reflected in the low practical and theoretical scores of PJKR students from the 2022 and 2023 cohorts. This issue indicates that the teaching methods applied so far have not been entirely effective in improving students' technical skills and theoretical understanding. However, mastery of good technique is essential, as badminton is a highly technical sport, where speed and precision in executing strokes are crucial in determining the final result of a match (Milon, 2014; Riza et al., 2018; Wang et al., 2023).

One of the main reasons for the low learning outcomes is the use of conventional and less interactive teaching methods (Huang, 2022; Suryadi et al., 2023; Wen, 2023). Methods that rely on lecturer demonstrations and monotonous exercises are insufficient to accommodate the

dynamic learning needs of students. Students tend to be passive in the learning process, merely receiving information without active involvement in the practical application of stroke techniques, which should be the core of badminton learning. This approach overlooks the principle that sports learning, especially in badminton, requires intense physical and mental engagement for students to understand and apply techniques correctly.

Many studies have explained various effective methods for improving stroke technique skills in badminton, such as repetitive drill exercises (Anggraini et al., 2022; Endrawan et al., 2024), target area practice on the court (Ayuningrum et al., 2021), and the shadow play method aimed at refining movements without a shuttlecock (Yukse & Aydos, 2017). However, methods that combine pedagogical approaches with more engaging exercise designs are still rarely found.

Research in the field of sports pedagogy emphasizes that learning methods that are more engaging and focus on active student involvement can significantly improve learning outcomes (Dogani, 2023; Rodríguez-García et al., 2022; Sørensen et al., 2023). In the context of badminton, stroke technique learning methods designed with a more creative and interactive approach, such as using mini-games, match simulations, and personalized feedback sessions, can have a greater impact on improving students' technical skills. These methods can also stimulate students' intrinsic motivation, ultimately improving the overall quality of learning.

This study aims to determine the effectiveness of a badminton learning program that utilizes a stroke technique learning method designed to be more engaging and interactive, and how it influences student learning outcomes. By involving students from Universitas Bung Hatta as research subjects, this approach will measure the success of the learning program through the analysis of final theory and practical exam scores. This research is expected to provide practical contributions to the development of more effective and relevant sports learning methods that meet students' needs, as well as improving the quality of teaching badminton techniques in an academic environment.

METHOD

This study is a type of quasi-experimental research aimed at uncovering the effectiveness of badminton learning through a stroke technique learning method that is designed to be more engaging and interactive for students at Universitas Bung Hatta, Padang City, West Sumatra Province, in the 2023-2024 Odd Semester. The population in this study consists of students from the Physical Education, Health, and Recreation (PJKR) Study Program at Universitas Bung Hatta, enrolled in the badminton course for the 2023-2024 Odd Semester, with a total of 14 students. The research instruments include practical and theoretical exams for badminton learning, which were combined and converted into final scores. Data analysis and hypothesis testing were conducted using comparative analysis techniques, employing the independent sample t-test at a significance level of $\alpha = 0.05$..

Research procedures

Before starting the research, the researcher designs all the necessary aspects, starting with submitting a research permission letter to the University of Bung Hatta. This permission letter is required as a form of approval from the university so that the research can be conducted on students enrolled in the Physical Education, Health, and Recreation Study Program. The researcher also prepares the necessary equipment, such as badminton rackets, shuttlecocks, and other supporting tools relevant to the teaching of badminton stroke techniques.

After the administrative and equipment preparations are complete, the researcher determines the research sample, which consists of students from the University of Bung Hatta.

All research participants voluntarily agree to participate, as evidenced by a consent statement signed by each student. This consent form is important to ensure that each participant understands the purpose and procedure of the research and is consciously willing to follow the entire research process.

To ensure that the participants are in good physical condition and able to follow the research process smoothly, each participant is required to submit a health certificate issued by a hospital or public health center. This certificate guarantees that the students involved in the research do not have medical conditions that could affect the research outcomes, particularly concerning their physical ability to perform badminton stroke techniques.

The research begins with a pre-test, which aims to measure the participants' skill level and theoretical understanding of badminton stroke techniques at the beginning of the study. This pre-test includes an assessment of basic stroke techniques, such as forehand, backhand, and smash, as well as theoretical questions. The results of the pre-test will serve as a baseline for comparing whether there has been an improvement in learning outcomes after the treatment is applied.

After the pre-test, participants undergo a treatment phase that lasts for 16 sessions. Each session is designed with an interactive and engaging approach to ensure participants are actively involved in the learning process. During the treatment phase, participants will practice badminton stroke techniques through repetition and technique refinement, with direct feedback provided by the instructor. The goal of this treatment is to improve participants' badminton stroke skills and their theoretical understanding of badminton, which is expected to result in significant changes in their learning outcomes.

At the end of the treatment phase, all participants will take a post-test, which follows a similar format to the pre-test, to assess their skill development and theoretical understanding after the learning sessions. The post-test aims to determine the extent to which participants' learning outcomes have changed after undergoing the treatment over 16 sessions. The results of the post-test will be compared with the pre-test results to assess the degree of improvement in the participants.

The data obtained from the pre-test and post-test will be analyzed using statistical methods. The researcher will calculate the mean scores and test whether there is a significant difference between the pre-test and post-test scores using a paired t-test. This t-test is used to identify whether the implementation of the more engaging and interactive badminton stroke teaching method has a positive and significant impact on the improvement of participants' learning outcomes.

The results of this data analysis are expected to provide a clear picture of the effectiveness of the badminton stroke teaching method applied in this research. If there is a significant improvement, it can be concluded that the method used is effective in enhancing students' badminton learning outcomes. Conversely, if no significant difference is found, the researcher will re-evaluate the applied teaching method and identify factors that may have influenced the research results.

Overall, this research procedure is designed with careful preparation and a systematic approach to ensure that the research outcomes are reliable and valid. The results of this research are expected to contribute to the development of badminton teaching methods in higher education, particularly in improving the effectiveness and engagement of badminton stroke skills teaching.

RESULTS AND DISCUSSION

FINDINGS

Based on the data obtained, the data is presented and described according to the objectives previously formulated. The measurement results regarding the effectiveness of badminton learning through a more engaging and interactive badminton stroke technique teaching method for students at Bung Hatta University, Padang City, West Sumatra Province, during the Even Semester of the 2023-2024 academic year, showed that the average pre-test score was 80.14 points, while the average post-test score increased to 81.27 points. Therefore, there was an average increase of 1.13 points or 1.41% in the effectiveness of badminton learning through the badminton stroke technique method for the students who participated in the study. The distribution can be seen in the following table:

Table 1. Distribution of Pre-Test and Post-Test Data

Data	number of samples	Badminton Stroke Technique Learning Data for Bung Hatta University Students (Points)			
		Avarage	SD	Max	Min
Pre-Test	14	80,14	4,13	85	70
Post-Test	14	81,27	3,95	85,9	73

Before the implementation of the badminton stroke technique learning method, an initial test (pre-test) was conducted on the student sample. This test covered both skill tests (practical) and theory tests administered to 14 students as research subjects. The pre-test results indicated that the highest score achieved by students was 85 points, while the lowest score was 77 points, with an average score of 80.14 points and a standard deviation of 4.13. The distribution of the pre-test badminton learning data for Bung Hatta University students in Padang City, Second Semester of the 2023-2024 Academic Year is presented in the following Table:

Table 2. Distribution of Badminton Learning Data Before the Application of the Badminton Stroke Technique Learning Method

Category	Score	Absolute Frequency	Relative Frequency (%)
Excellent	> 85,34	0	0
Good	82,21 < X ≤ 85,34	4	28.57
Satisfactory	78,08 < X ≤ 82,21	7	50.00
Insufficient	73,95 < X ≤ 78,08	2	14.29
Very Insufficient	< 73,95	1	7.14
Total		14	100

Based on the distribution table of the pre-test results for badminton learning above, out of 14 students, 4 students (28.57%) are categorized as good with a score range of 82.21 - 85.34. A total of 7 students (50%) fall into the satisfactory category with a score range of 78.08 - 82.21. Then, 2 students (14.29%) are classified as insufficient with a score range of 73.95 - 78.08, and 1 student (7.14%) falls into the very insufficient category with a score below 73.95. No student is categorized as excellent. To further clarify the distribution of badminton learning data from the 14 students of Universitas Bung Hatta, Semester Genap, Academic Year 2023-2024, the following histogram chart can be referred to.

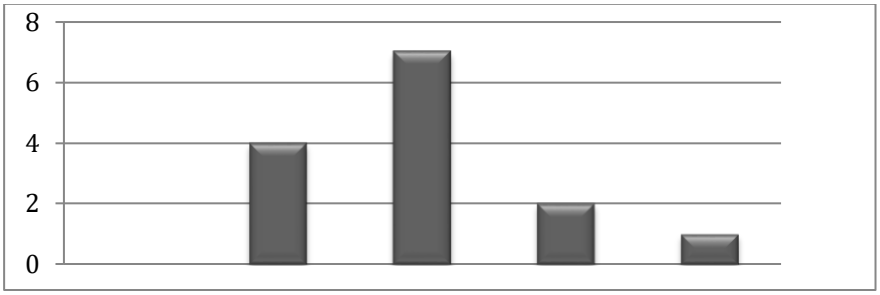

Figure 1. Distribution of Badminton Learning Data After Treatment with the Badminton Stroke Technique Learning Method

After the students were given treatment in the form of badminton stroke technique instruction for one semester or 16 meetings, using a more engaging and interactive method, a final test (post-test) was conducted to evaluate the badminton learning outcomes. In the post-test administered to 14 students, the highest score achieved was 85.90 points, the lowest score was 78 points, with an average score of 81.27 points and a standard deviation of 3.95. To observe the distribution of the post-test results in badminton learning through the stroke technique teaching method for students at Universitas Bung Hatta, Padang City, during the Even Semester of the 2023-2024 Academic Year, refer to the following table:

Table 3. Distribution of Badminton Learning Data After Treatment with the Badminton Stroke Technique Learning Method

Category	Score	Absolute Frequency	Relative Frequency (%)
Excellent	> 87,20	0	0
Good	83,25 < X ≤ 87,20	5	35.71
Satisfactory	79,30 < X ≤ 83,25	3	21.43
Insufficient	75,35 < X ≤ 79,30	5	35.71
Very Insufficient	< 75,35	1	7.14
Total		14	100

Based on the distribution table of the badminton learning data for the post-test, the results show that out of 14 students, 5 students (35.71%) fall into the "Good" category with scores ranging from 83.25 to 87.20, 3 students (21.43%) fall into the "Satisfactory" category with scores ranging from 79.30 to 83.25, 5 students (35.71%) fall into the "Poor" category with scores ranging from 75.35 to 79.30, and 1 student (7.14%) falls into the "Very Poor" category with scores less than 75.35. There are no students in the "Very Good" category.

For a clearer understanding of the post-test data on badminton learning from 14 students at Universitas Bung Hatta, Padang, for the Odd Semester of the 2023-2024 academic year, after being treated with the badminton stroke technique learning method, the data can be illustrated through the following histogram:

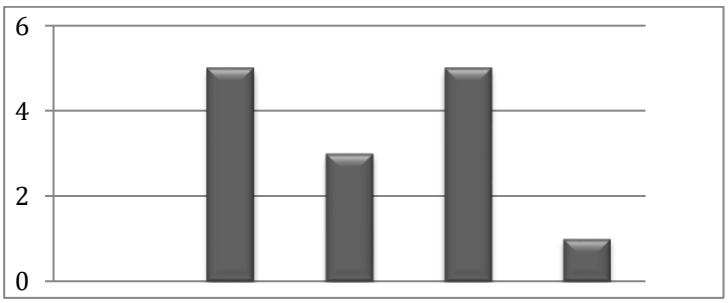

Figure 2. Histogram of Post-Test Data for Badminton Learning from 14 Students of Universitas Bung Hatt

Based on the description of the pre-test and post-test data above, it is evident that there was an increase in the average effectiveness of badminton learning through the badminton stroke technique teaching method, which was designed to be more engaging, for students at Universitas Bung Hatta, Padang City, during the Even Semester of the 2023-2024 Academic Year, from 80.14 points to 81.27 points.

Before hypothesis testing, a prerequisite data analysis test, specifically the normality test, was conducted. The normality test was performed using the Liliefors test. The results of the normality test showed that the L calculated value for the pre-test data was 0.131, which is smaller than the L table value of 0.227, indicating that the pre-test data are normally distributed. The normality test results for the post-test data, after applying the more engaging badminton stroke technique teaching method to Universitas Bung Hatta students in Padang City, also indicated that the L calculated value of 0.164 is smaller than the L table value of 0.227. Therefore, it can be concluded that both the pre-test and post-test data are normally distributed.

To ensure that the data used met the analysis requirements, a homogeneity of variance test was conducted on the variables studied with a significance level of $\alpha = 0.05$. The results of the homogeneity test calculations indicated that the calculated F value obtained was smaller than the F table value at a significance level of $\alpha = 0.05$. Thus, it can be concluded that the data groups used in this study come from a homogeneous population, meaning there is no significant difference between the variances of the groups tested.

T-Test (Mean Difference Test)

To test the hypothesis proposed in this study, a t-test was conducted to determine whether there was a significant difference between the pre-test and post-test scores in badminton learning through the more engaging badminton stroke technique teaching method. This t-test was used to compare the mean pre-test and post-test scores to assess the effectiveness of the treatment applied. The results of this t-test will provide an overview of the extent to which the application of a more engaging and interactive badminton stroke technique teaching method can influence the improvement of students' skills and understanding in badminton. The following are the t-test results conducted to assess the mean difference between the pre-test and post-test scores of Universitas Bung Hatta students, Padang City, during the Even Semester of the 2023-2024 Academic Year.

Table 4. Summary of T-Test Results

Dk= (N-1)	t_calculated	T_{table} $\alpha = 0,05$	Coculsion
14 – 1 = 13	3,52	1,770	Ho rejected, Ha accepted

Based on the results of the t-test calculation, the calculated t-value (t_hitung) was 3.52, which is greater than the t_table value of 1.770 (t_hitung > t_tabel). This indicates that the research hypothesis proposed can be empirically accepted as true. Thus, it can be concluded that there was a significant improvement in the effectiveness of badminton learning through the more engaging badminton stroke technique teaching method for Universitas Bung Hatta students, Padang City, during the Even Semester of the 2023-2024 Academic Year. Therefore, it can be concluded that the more engaging badminton stroke technique teaching method is effective in improving badminton learning outcomes.

DISCUSSION

This study aimed to determine the effectiveness of badminton learning through the badminton stroke technique teaching method, which was designed to be more engaging among students at Universitas Bung Hatta, Padang City, in the Even Semester of the 2023-2024 academic year. Based on the analysis results, there was a significant improvement in the average pre-test and post-test scores, indicating that the implementation of this teaching method positively impacted students' badminton skills. The increase in the average score by 1.13 points (1.41%) demonstrates a positive change in the badminton skills acquired by students during the course.

This finding aligns with the research conducted by González-Peño (2024) who found that teaching methods applied interactively and comprehensively can significantly improve students' skills. In their study, structured and repetitive practical teaching methods were proven to enhance basic badminton skills, particularly in the aspect of stroke techniques. Similarly, the research by Cahyadi et al (2022) showed that the application of skill-based active learning (such as stroke technique drills) effectively drives skill improvement, as evidenced by the performance enhancement in athletes after a well-designed training program.

The improvement found in this study is not only reflected in the increase in the average pre-test and post-test scores but also in the distribution of results, which shows improvements in the grade categories. Previously, the majority of students fell into the "average" and "poor" categories, but after the treatment, more students achieved the "good" category. This illustrates the effectiveness of stroke techniques in improving students' skills, consistent with the findings of Kamaruddin et al (2020) and Hidayat et al (2022), who found that basic technique teaching through interactive practice methods significantly improved technical skills in novice athletes.

It is important to note that, although there was significant improvement in most students, some students remained in the "poor" and "very poor" categories on the post-test. This phenomenon indicates that, although the applied method was effective for most students, individual factors such as physical readiness and initial understanding of the stroke technique can influence learning outcomes.

Furthermore, the t-test results, which showed that the t_calculated was greater than the t_table (3.52 > 1.770), provide strong statistical evidence that the difference between the pre-test and post-test scores is empirically significant. The application of this method, which emphasizes practical interaction, allowed students to gain direct experience that enriched their understanding of badminton stroke techniques.

However, these results suggest that further development is needed to enhance the effectiveness of the teaching, especially for students who have not yet reached the "good" category. For instance, the research by Kalyoncu and Özdemir (2018) showed that structured training with more frequent repetitions of techniques can lead to faster and more consistent skill improvements across all participants. Therefore, in future research, aspects such as training duration, frequency of technique repetition, and adaptation of methods to the physical condition and individual abilities of students should be considered to achieve more optimal results.

Overall, the results of this study contribute to the development of badminton teaching methods, particularly in the application of stroke techniques. The implementation of more engaging and interactive methods has proven effective in improving students' skills, although challenges related to the diversity of students' initial skill levels remain an important consideration for future research.

CONCLUSION

Based on the results of the study, it can be concluded that badminton learning through the badminton stroke technique teaching method for students at Universitas Bung Hatta, Padang City, during the Even Semester of the 2023-2024 Academic Year showed a significant improvement. This improvement is evident from the comparison of the mean pre-test and post-test scores, which indicates an enhancement in students' badminton stroke technique skills after the treatment was applied for one semester using a more engaging and interactive method.

The analysis results showed an increase in the mean score by 1.13 points (1.41%), indicating the effectiveness of the teaching method in improving students' skills. The application of the stroke-based method has proven to have a positive impact on students' learning outcomes in badminton, in line with previous research findings that show that learning approaches that are more interactive and skill-based can lead to significant improvements in skill acquisition.

However, despite the significant improvement, some students still did not reach the "good" category in the post-test. This suggests the need for adjustments in the teaching method to ensure that all students can achieve optimal results, taking into account individual aspects such as physical readiness and initial understanding of the techniques being taught.

Overall, the results of this study provide empirical evidence that the badminton stroke technique teaching method can enhance the effectiveness of badminton learning for students. Therefore, this method can serve as a reference for further improvements and development in the process of badminton learning at higher education institutions, considering the individual variables of students that may influence their learning outcomes.

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CONFLICT OF INTEREST

Authorcertify that there is no actual or potential conflict of interest in relation to this article.

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