



The Effectiveness of Basic Rope Media in Improving Underhand Passing Ability in Volleyball

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Abstract

Underhand passing is one of the important basic techniques in volleyball that must be mastered by elementary school students, but observations show that students' ability to control the direction and bounce of the ball is still low. This study aims to determine the effectiveness of using Rope Bottom media in improving elementary school students' underhand passing abilities. This study used an experimental method with a pre-experimental one-group pretest-posttest design. The study population was 30 students who participated in volleyball extracurricular activities, with a sample of 15 students selected using a purposive sampling technique. The instrument used was a 60-second underhand passing test with a scoring system based on the number of valid bounces in the target box. Data analysis was carried out through descriptive statistics, the Shapiro-Wilk normality test, paired sample t-test, and Cohen's d effect size calculation using IBM SPSS Statistics. The results showed an increase in the average score from 11.87 in the pretest to 23.07 in the posttest. The paired sample t-test showed a significance value of <0.05 , which means there was a significant difference between before and after treatment. The very large effect size indicates that the Rope Bottom media has a strong influence in improving students' underhand passing ability. Therefore, it can be concluded that the use of Rope Bottom media is effective in improving elementary school students' underhand passing ability and can be an alternative, innovative, and applicable physical education learning medium.

How to Cite

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INTRODUCTION

Volleyball is a popular sport taught in elementary schools, developing motor skills, coordination, and teamwork. There are many fundamental volleyball techniques to master. Furthermore, knowledge of basic serving, passing, smashing, blocking, and effective teamwork, in accordance with the rules of the game, is essential. (Sumantri et al., 2023) One of the basic techniques that is the foundation of volleyball is the underhand pass, which is a technique of passing the ball in a controlled manner to a teammate in response to an opponent's serve or attack. (Bumburo et al., 2023).

According to Alpani, (2023) New training aids have proven effective in improving basic technical skills in sports, including basic volleyball techniques such as underhand passing, because they provide more measurable and engaging training stimulation for learners. (AN Pratama et al., 2025) using a modified ball as a learning medium to improve underhand passing techniques with significant results. Previous research according to (Fidiansyah, 2025) Research shows that changing media such as rubber balls can improve these students' underhand passing skills because it makes it easier for them to control the ball and helps develop motor coordination. (Mohammad Agung Pratama, Ruruh Andayani Bakti & Muharram, 2024) The STAD cooperative model has been shown to improve student interaction and learning outcomes in underhand passing techniques. Research shows that selecting the right media is crucial for enabling students to learn basic techniques more quickly, safely, and effectively.

According to several theoretical studies, learning basic volleyball techniques, including underhand passing, is closely related to the use of appropriate learning media. Students need repetition of movements and support from media that can help them understand ball control visually and kinesthetically, thus making the learning process more effective. The creative and structured use of wall media in learning can significantly improve students' underhand passing skills through more focused and directed practice on directional control and consistency of movement technique. (Purwaningsih et al., 2025) Moreover, compared to conventional methods, audiovisual media increases visual stimulation and student motivation to learn. Studies using audiovisual media have also shown better learning outcomes, with students achieving better passing grades. (Tarlina & Daryanto, 2022) According

to Atmianti et al., (2022) shows that plastic ball media as a modification of training media has a positive effect on students' underhand passing abilities.

According to Dai et al., (2021) Research in the field of physical education generally uses classroom action research designs or experiments with a single pretest-posttest group, and utilizes instruments such as skills tests, observations, and documentation with students or young athletes as subjects. However, there are not many studies that specifically evaluate the effectiveness of using specific media tools such as Rope Bottom in elementary school learning with a measurable experimental approach. This indicates the importance of research that not only develops variations in learning media but also provides stronger empirical evidence regarding the role of assistive devices in improving students' underhand passing skills. (Saifudin et al., 2023).

My observations indicate that many elementary school students still struggle to control the direction and force of the ball's bounce when executing underhand passes. Students are also inconsistent in maintaining the bounce angle, which often results in the ball going towards a teammate. This situation highlights the need for learning materials that can help students understand the concept of bounce control in a more specific and organized manner.

Previous research has focused more on the effectiveness of cooperative learning models, ball modifications, or simple media such as walls and plastic balls in improving underhand passing skills. (S. Pratama et al., 2023) However, there are still limitations in research that specifically and measurably tests the use of Rope Bottom media in elementary school students, especially by using an experimental approach that analyzes the magnitude of the increase in abilities quantitatively.

This innovation lies in the Rope Bottom, a tool designed to help beginners improve their underhand passing skills in a more controlled and targeted manner. This innovation aims to make it easier for students to control the direction and bounce of the ball, thereby reducing technical errors when performing underhand passes. Furthermore, the use of this tool also provides benefits in training focus, motor coordination, and consistent ball control during practice. Technically, this tool is designed by attaching a kretekan (cricket bat) to the chest, and a rope that is adjusted to the user's arm length, then connected to the ball and reinforced with duct tape so that it can be used effectively in the process of practicing

underhand passing.

The purpose of this study was to determine the effectiveness of using the Underhand Rope method in improving elementary school students' underhand passing skills. Therefore, the results are expected to contribute to the development of Physical Education (PE) learning methods, especially through the use of creative, simple, and easy-to-apply media to improve students' underhand passing skills in volleyball more effectively.

METHOD

This study used an experimental method with a pre-experimental one-group pretest-posttest design. In this design, a pretest was administered before treatment and a posttest after treatment to determine changes in underhand passing ability after using the Rope Bottom media.(Firmansyah et al., 2021). The pre-experimental design was chosen because the study only involved one group without a control group, allowing researchers to directly observe the effects of the treatment by comparing the results before and after the intervention in the same group. Thus, changes in student abilities can be observed more objectively and in a controlled manner even without external comparators. The study was conducted during the volleyball extracurricular activities at MI An Nibrosiyyah. The research activities were carried out for 6 meetings focused on training to improve basic underhand passing skills using Rope Bottom media.

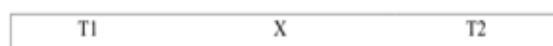


Figure 1. One group pre-test-post-test design.
Source: Maksum, 2012(Alvianto et al., 2023)

Information:

T1 = Pre-test

X = Care (Treatment)

T2 = Posttest

The population in this study were all 30 students of Mi An Nibrosiyyah who participated in volleyball extracurricular activities. The research sample was determined using a purposive sampling technique, namely the selection of samples based on certain considerations that are in accordance with the research objectives, so that an experimental group of 15 students or 50% of the total population was obtained. This research was conducted in 6 meetings that focused on improving volleyball underhand passing skills. This technique was chosen because the sample

had characteristics that were in accordance with the research needs, namely students who were studying basic underhand passing techniques in Physical Education (PE) learning. The use of a purposive sampling technique is considered appropriate in experimental educational research when researchers consider the suitability of the subject's characteristics with the research objectives.(Mulyani & Sudiyana, 2022).

The instrument used is a graduation test using a wall composed by(Marasati, 2022)The underhand passing test is used to determine the level of students' passing ability using tools such as a wall that has been given a square target, a volleyball, a whistle, and writing tools. The test is carried out with participants standing in front of the square target, then after the first whistle is blown, participants make an overhand pass or underhand pass according to instructions for 60 seconds which is calculated using a stopwatch, and stops when the second whistle is blown. Scoring is done by giving a score of 1 for each pass that is done legally and hits the square target, while a legal pass that does not hit the square target or touches the line is given a score of 0; if the ball falls or touches the ground, the test is continued again with the initial throw and the throw is not counted, so that the final score is obtained from the number of legal passes that hit the square target.

Table 1. Test Passing Assessment Criteria

Reach	Criteria
0-10	Very less
11-20	Not enough
21-30	Enough
31-40	Good
41-50	Very good

The data analysis technique in this study was carried out quantitatively to determine the effectiveness of using Rope Bottom media in improving elementary school students' underhand passing skills. Data obtained from the pretest and posttest results were first analyzed using descriptive statistics to determine the average (mean), minimum, maximum, and standard deviation values as a general description of students' abilities before and after the treatment.(Thamkaniah et al., 2024)Next, a prerequisite analysis test was conducted in the form of a normality test using the Shapiro–Wilk method to ensure the data were normally distributed. If the data met the normality assumption (Sig. > 0.05), then the hypothesis testing was conducted using a parametric paired

sample t-test because this study compared two means from the same group at two different measurement times. The decision-making criteria were set at a significance level of 0.05, that is, if the Sig. (2-tailed) value < 0.05 , there was a significant difference between the pretest and posttest results. In addition, to determine the magnitude of the treatment effect, the effect size was also calculated using the Cohen's d formula. The entire data analysis process was carried out with the help of IBM SPSS Statistics software.

RESULTS AND DISCUSSION

The results of the descriptive statistical analysis showed that there were approximately 15 students in the pretest and posttest samples. The pretest results showed a minimum score of 8.00 and a maximum of 15.00 with a mean of 11.8667 and a standard deviation of 1.76743, indicating that students' initial passing scores were relatively low and the data were quite uniform. After the test was administered, the results showed a significant increase, with a minimum score of 19.00 and a maximum of 28.00, and a mean increase of 23.0667 and a standard deviation of 2.49189. The average increase from pretest to posttest indicates that students' passing ability has increased after using educational media, while the slightly higher standard deviation indicates that students' abilities vary, although generally experiencing a positive increase.

Table 2. Descriptive Statistics

	N	Min	Max	Means	Standard Deviation
Pre-test	15	8.00	15.00	11.8667	1.76743
Post-test	15	19.00	28.00	23.0667	2.49189

Table 3. Normality Test

Variables	Statistics	df	Signature
Pre-test	952	15	,563
Post-test	,971	15	,877

The results of the normality test using the Shapiro-Wilk method show a significance level (Sig.) for the pretest data of 0.563 with a statistical value of 0.952 and df 15, while the significance level for the posttest data is 0.877 with a statistical value of 0.971 and df 15. This significance level is greater than 0.05, so it can be concluded that the data from the pretest and posttest have a normal distribution. As a result, the data in this study have met the assumption of normality, thus allowing us to proceed to the parametric statistical analysis stage, namely the paired sample t-test.

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The results of the hypothesis testing using the paired sample t-test showed that the mean difference between the pretest and posttest was approximately 11.20000, with a standard deviation of 1.32017 and a mean error of 0.34087. The 95% confidence interval for the difference was found to be in the range of -11.93109 to -10.46891, indicating that the mean difference was consistent and could not be ignored. The degrees of freedom (df) of 14 and the significance value (Sig. 2-tailed) < 0.001 were associated with a calculated t-value of 32.857. Considering the significance level of less than 0.05, it can be concluded that there is a significant difference between the pretest and posttest results, which means that the activities offered are effective in improving students' passing grades.

Based on the Paired Sample Effect Size, the effect size value for the pretest-posttest pair using Cohen's d is -8.484 with a standardization of 1.3202 and a 95% confidence interval ranging from -11.625 to -5.334. In addition, based on Hedges' correction, the value is -8.020 with a standardization of 1.3966 and a 95% confidence interval between -10.989 and -5.042. The very large effect size value (well above 0.80) indicates that the treatment given has a very strong influence in improving students' underhand passing ability. Although the value is negative because the calculation of the difference is carried out from the pretest to the posttest, substantially this result confirms that there is a very significant increase in ability after the treatment is given.

The results of the study showed that the use of Rope Bottom media had a very strong influence in improving students' underhand passing abilities. Descriptively, there was an increase in the average score from 11.8667 in the pretest to 23.0667 in the posttest, which indicates an increase in basic technique abilities after being given treatment. The results of the paired sample t-test confirmed this finding with a significance value of < 0.05 , so there was a significant difference between abilities before and after treatment. (Qusyari et al., 2025) This finding is in line with experimental research on physical education using a single-group pretest-posttest design, where treatment in the form of innovative media or learning models has been proven to be able to significantly improve student learning outcomes. (Najib et al., 2022).

A very large effect size (Cohen's d) indicates that the treatment effect is not only statistically significant but also practically robust. In the

context of physical education (PE) learning, the use of media that provides clear boundaries and bounce directions can help students understand ball angle control and power in a more structured way. Previous research has shown that modifying learning media, such as the use of modified balls or training aids, can gradually improve the accuracy and consistency of underhand passes. (Paper, 2025).

In theory, learning motor skills requires repeated, directed practice and clear feedback to develop optimal motor coordination. The Rope Bottom media serves as a visual and kinesthetic aid that makes it easier for students to control the direction and bounce of the ball, making the learning process more effective and efficient. (Zaenudin et al., 2023) Thus, the results of this study strengthen the empirical evidence that simple but structured learning media innovations can significantly improve the learning outcomes of basic volleyball techniques, especially underhand passing skills in elementary school students. It is recommended that physical education (PE) teachers use Rope Bottom as an alternative learning tool to optimally improve students' underhand passing skills. Furthermore, further research is expected to develop various other learning media innovations and test them at different educational levels with a larger sample size, allowing for broader and more in-depth generalization.

CONCLUSION

The results of the research conducted indicate that the use of Rope Bottom media is effective in improving elementary school students' underhand passing skills. This is evidenced by an increase in the average score from 11.8667 in the pretest to 23.0667 in the posttest. The results of the paired sample t-test showed a significance value of <0.05 , which means there is a main difference in abilities before and after treatment. In addition, the very large effect size value (Cohen's d) indicates that the influence of using Rope Bottom media is not only statistically significant. Furthermore, the Rope Bottom media also has a very strong practical impact in improving underhand passing skills. Overall, the Rope Bottom media has been proven to help students control the direction and bounce of the ball in a more focused and consistent manner, thereby making learning basic volleyball techniques more effective. Therefore, this media can be used as an innovative alternative in Physical Education learning, particularly to improve underhand passing skills in elementary school students.

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