

Enhancing Underhand Volleyball Serve Learning Outcomes Using Rubber Balls in Elementary Schools

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Abstract

Objectives. This study aims to address the difficulties in underhand serving by improving students' underhand serve ability through training with rubber balls. The research focuses on fourth-grade students at SD Negeri 1 Sangubanyu during the 2024/2025 academic year in volleyball learning sessions.

Material and Methods. This research employs a Classroom Action Research (CAR) methodology, consisting of four stages: planning, implementation, observation, and reflection. Data collection instruments include tests and observations. The study population comprises all 13 fourth-grade students at SD Negeri 1 Sangubanyu, consisting of 9 boys and 4 girls. Data analysis was conducted by reflecting on the observations and evaluations of the learning process, with a quantitative approach providing numerical results.

Results. The data analysis revealed an improvement in learning outcomes over two cycles. The mastery learning rate in the first cycle was 14.28%, while in the second cycle, it increased significantly to 71.57%.

Conclusion. The findings indicate that utilizing rubber balls in underhand serve training can assist educators in determining effective teaching methods to enhance students' learning outcomes in volleyball, particularly at the elementary school level. However, the study faced certain limitations, as only 4 students achieved mastery in the initial observation, while 9 students did not. To address this, rubber balls were introduced as an alternative learning aid, making the learning process more engaging and improving students' understanding of the fundamental serve motion. Additionally, time constraints limited the ability to observe long-term progress comprehensively. This study solely focused on underhand serve skills without addressing other aspects of volleyball. The findings serve as a reference for designing more effective and enjoyable learning programs, facilitating students' comprehension of basic serving techniques. Future researchers are encouraged to further develop this method using other assistive tools, while PE teachers may adopt or modify this approach with various instructional adaptations.

Keywords: Underhand Serve, Rubber Ball Modification, Elementary School Volleyball Training

Introduction

The low quality of education in Indonesia has been a long-standing issue. However, to this day, the problem remains unresolved. Education plays a fundamental role in shaping individuals (Triana et al., 2022). Currently, education and the learning process are often perceived as synonymous with schooling. Formal learning activities in schools are systematically designed and implemented under the guidance of teachers. The learning objectives that students aim to achieve are formulated into specific goals, followed by the development of appropriate instructional materials, selection of suitable methods, and implementation of assessments to evaluate student progress.

Physical education is a learning process that occurs through physical activities. According to Hidayat et al. (2023), the goal of physical education is to foster holistic child development through physical activities—not only focusing on physical growth but also enhancing mental, social, emotional, and intellectual development. Physical education can be categorized into four key areas: (1) physical development, (2) motor skills development, (3) mental development, and (4) social development. Its purpose is to encourage a balanced development of students' attitudes, mental well-being, social interactions, emotions, and motor skills.

Given the significance of physical education in schools, teachers must provide proper guidance to students in learning physical education, sports, and health. Through physical education, teachers are expected to teach fundamental movement skills, techniques, and strategies in sports and games while instilling values such as sportsmanship, honesty, and teamwork (Wibowo, 2020). In physical education, the teacher's role extends beyond teaching motor skills and game strategies; they also play a crucial role in instilling moral values and cooperative behaviors. Therefore, teaching fundamental movement skills and game strategies is essential, particularly in volleyball.

Volleyball is a sport enjoyed by individuals of all ages, from children to adults, both male and female, and is popular in both urban and rural communities. As stated by Saputra et al. (2022), "Volleyball is a widely popular sport among the general public." According to Khadavi (2024), volleyball is a sport played between two teams of six players each, where the game starts with a serve, and players attempt to score points by sending the ball over the net into the opponent's court. The game is played on a rectangular court measuring 9m × 18m, with a net placed in the middle.

Volleyball can be played by individuals of various age groups and genders. It involves two teams competing against each other by sending a large ball over a net that divides the

court. Each team must use fundamental movements and tactics to score points. According to Yudiana et al. (2020), volleyball is classified as a game and sports activity. Each team is allowed a maximum of three touches per play, and no player can touch the ball twice in succession unless blocking. A well-played volleyball game showcases skillful techniques, strategic plays, and dynamic movements.

Imron & Kriswanto (2023) state that the objective of volleyball is to send the ball over the net so that it lands on the opponent's court while preventing the opposing team from doing the same. Each team is allowed three touches to return the ball. As a widely contested sport, volleyball can be played both outdoors and indoors. It is particularly popular among students at SD Negeri 1 Sangubanyu, Kecamatan Buluspesantren, Kabupaten Kebumen, as evidenced by their frequent engagement in volleyball during breaks and their enthusiasm for playing the sport during physical education classes. One of the most crucial skills in volleyball that significantly impacts performance is the underhand serve. Initially considered merely a way to start the game, the serve has evolved into an effective offensive weapon.

Serving, which marks the beginning of play, has developed into a technique used for offensive strategies (Oktaviani et al., 2021). Similarly, Khirom et al. (2022) state that "the serve is a fundamental skill used to initiate a set or match; initially, it was meant to put the ball in play, allowing the opponent to launch an attack. However, as volleyball evolved, the serve has become an offensive tool. A well-executed serve can disrupt the opponent's defense and hinder their attacking capabilities." Given the critical role of serving in volleyball, every player must master the fundamental serving techniques. An effective serve requires precision and power, making it difficult for opponents to receive, thereby increasing the serving team's chances of scoring points. According to Sujito (2024), there are various types of serves, each with distinct characteristics and techniques.

The underhand serve is commonly used by beginners due to its simplicity and ease of execution. This technique is particularly suitable for novice players and female athletes, who may lack the strength needed for more powerful serves (RD, 2023). The motion of an underhand serve is natural, requiring less force. However, incorrect execution can result in poor ball direction. Observations of fourth-grade students at SD Negeri 1 Sangubanyu, Kecamatan Buluspesantren, Kabupaten Kebumen, reveal that they struggle with performing an effective underhand serve.

Field observations indicate that nearly all students face difficulties executing proper underhand serves during volleyball lessons. This struggle stems from the lack of instructional variety provided by teachers. Several common issues observed among fourth-grade students

include: (1) insufficient arm swing strength, preventing the ball from crossing the net, (2) improper ball toss before serving (too close or too far from the body), making it difficult to strike the ball accurately, and (3) incorrect hand contact with the ball, causing the serve to go off-target. These challenges motivated the researcher to conduct this study, aiming to introduce a more effective approach to teaching underhand serving using rubber balls as an alternative to traditional volleyballs.

This study emphasizes innovation in teaching methods and instructional tools, focusing specifically on technical skill development (underhand serving) rather than broader aspects of volleyball, which have been the focus of previous research. The use of rubber balls as training aids and a descriptive approach tailored to elementary school students make this research more specific and applicable to the learning environment at SD Negeri 1 Sangubanyu, Kecamatan Buluspesantren. Given the recent emphasis on improving physical education methodologies, this study presents a practical solution for teaching fundamental sports techniques. Using rubber balls in underhand serve training enhances convenience, effectiveness, and safety for elementary school students while creating a more engaging and enjoyable learning experience.

This research is essential as it provides an innovative solution for improving volleyball underhand serve learning among elementary school students. By utilizing rubber balls as an instructional tool suited to their physical development, this study contributes to designing more effective and enjoyable teaching methods. It also supports the enhancement of physical education quality at the elementary level. The novelty of this study lies in the use of rubber balls as an instructional aid to help young learners grasp the underhand serving technique more efficiently. This research introduces not only a new training tool but also a methodology that simplifies the learning process, ultimately enhancing students' technical abilities in volleyball.

Based on this background, the researcher is motivated to conduct this study, titled: "Enhancing Underhand Volleyball Serve Learning Outcomes Using Rubber Balls in Elementary Schools."

Materials and Methods

Study Participants.

From the population, a set of data can be collected to address the research problem. According to Ansyu et al. (2023), "A population is a generalization area consisting of objects/subjects with specific qualities and characteristics determined by the researcher to be studied and from which conclusions are drawn."

In this study, the population consists of fourth-grade students at SD Negeri 1 Sangubanyu for the 2024/2025 academic year. The class comprises 13 students, including 9 male and 4 female students. These students participated in learning the underhand volleyball serve using rubber balls. The research was conducted over six sessions, with one cycle consisting of three sessions.

The sampling method used in this study is total sampling. According to G et al. (2024), total sampling is a sampling technique where the entire population is used as the sample. This study employs total sampling by including all fourth-grade students at SD Negeri 1 Sangubanyu as research subjects. The total sampling approach was chosen because the population size is fewer than 100, making it feasible to use the entire population as the sample.

Study organization.

This study employs a Classroom Action Research (CAR) design, as described by Ariyati et al. (2023). The research was conducted in two cycles, with each cycle comprising four crucial stages: planning, implementation, observation, and reflection. These four stages form a continuous cycle, starting from the planning phase and ending with reflection.

The number of cycles depends on whether further action is still required. The research process is considered sufficient based on the extent to which the learning problem has been effectively addressed.

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Figure 1: Siklus PTK

In this study, the Classroom Action Research (CAR) cycle was implemented, incorporating both independent and dependent variables. At the final implementation stage

(pretest), the research employed a test-based assessment. The test used in this study was the AAHPER Serving Accuracy Test, as described by Ginting & Sari (2022). This test involves executing an underhand serve over the net 10 times, with a validity score of 0.811 and a reliability score of 0.890.

Data analysis in this research was conducted by reviewing observations and assessing the learning process. The collected data were analyzed quantitatively to generate numerical results. This approach allowed the researcher to gather field data and observational insights, analyze the findings, and determine the extent of improvement in students' underhand serving skills.

Statistical analysis.

The data collected from each observation activity in the Classroom Action Research (CAR) cycle were analyzed descriptively. The data analysis process involved reviewing observations and assessing the learning process, followed by quantitative analysis to generate numerical results.

The scoring criteria for evaluating underhand serve technique in volleyball were as follows:

- 1) Score 4: If all movements are performed correctly.
- 2) Score 3: If one movement is performed incorrectly.
- 3) Score 2: If only two movements are performed correctly.
- 4) Score 1: If only one movement is performed correctly or if all movements are incorrect.

Table 1: Standard Assessment Criteria for Underhand Serve Learning Outcomes in

Volleyball		
Jumlah skor	Nilai	Kategori
42-48	90	Baik Sekali
35-41	80	Baik
28-34	70	Cukup
21-27	60	Kurang
12-20	50	Kurang Sekali

Mulyadi et al., 2020

Results

This study was conducted from January 2 to February 28, 2025, at Sekolah Dasar Negeri 1 Sangubanyu, Buluspesantren District, Kebumen Regency, during the 2024/2025

academic year. The data was obtained based on the initial observation stage. The preliminary test phase aimed to determine whether the data to be collected in the field was truly suitable for the research. During the initial observation stage, the researcher did not provide any treatment or intervention to the respondents.

Table 2. Initial Observation Percentage

Students	Percentage (%)	Description
4	29.17	Passed
9	70.83	Not Passed

Based on the pre-action test results, which assessed three aspects—initial stance, execution stance, and final stance—it was concluded that out of the 13 students who participated in the test, 4 students were categorized as passing, with a percentage of 29.17%, while 9 students did not pass, with a percentage of 70.83%.

The next step taken by the researcher is to provide a treatment in the form of underhand serving practice using rubber balls. Following this intervention, a final implementation test will be conducted in Cycle I to assess the improvement in underhand serving skills after the treatment.

Table 3. Cycle I Results

Students	Percentage	Description
6	45.83%	Passed
7	54.17%	Not Passed

Meanwhile, the recapitulatory results of Cycle I, based on the final learning outcome analysis from the 13 students who took the test, indicate an improvement in underhand serve performance from Cycle I to Cycle II. This improvement is reflected in the number of students who passed. In Cycle I, 6 students were classified as "Passed" with a percentage of 45.83%, while 7 students were classified as "Not Passed" with a percentage of 54.17%.

Table 4. Cycle II Results

Students	Percentage	Description
10	84.33%	Passed
3	15.67%	Not Passed

In Cycle II, 10 students were declared "passed" with a percentage of 84.33%, while 3 students were declared "not passed" with a percentage of 15.67%. This indicates an improvement in students' learning outcomes across the three aspects by 38.50%.

**Figure 2.** Diagram of Cycle 1, Cycle 2, and Improvement**Figure 3.** Diagram of Underhand Serve Execution Attitude in Cycle 1 and Cycle 2

Discussion

Sampling Technique and Relevant Research

The sampling technique employed in this study is total sampling. The researcher relies on previous relevant studies not only as references but also to identify the distinctions between past research and the present study. The relevant studies include:

1. Suyud Sri Wahyuningsih (2019) – *Efforts to Improve Underhand Service Skills in Volleyball Learning through Ball Modification for Fourth-Grade Students at SD N 3 Binangun Karangobar Banjarnegara, First Semester of the 2019/2020 Academic Year.*
2. Ridhwan Dwi Zuhair (2024) – *Efforts to Improve Volleyball Underhand Service Learning Outcomes Using Sponge Balls for Seventh-Grade Students at MTsN 39 Jakarta.*
3. Raden Willy Winengku Widhiasto (2020) – *Enhancing Mini Volleyball Underhand Service Learning Outcomes through a Step-by-Step Learning Approach.*

Research Novelty

Building upon previous research, this study introduces a novel approach by utilizing rubber balls as a training aid, specifically designed to accommodate the physical capabilities of elementary school students. This alternative is expected to provide a more effective and accessible method for teaching complex fundamental techniques. Compared to similar studies, the findings of this research aim to demonstrate that the use of rubber balls in underhand service training can accelerate student comprehension, enhance motor skills, and minimize difficulties in mastering the service technique. These benefits may not be observed in previous studies that employed standard volleyballs without additional assistive tools.

In this study, the researcher applies rubber balls as a teaching aid to facilitate the learning process of underhand service in volleyball, ensuring that students enjoy the learning experience through engaging and interactive methods introduced by the instructor.

Data Collection and Initial Test Results

Research data were collected through underhand service performance tests using rubber balls. Each student underwent a service accuracy test without receiving any prior intervention or treatment. The pre-test results revealed the following:

1. 9 students (70.83%) did not meet the minimum competency threshold (not competent).
2. 4 students (29.17%) achieved the competency standard (competent).

These findings indicate that the students' underhand service proficiency was generally low, particularly among fourth-grade students at SD Negeri 1 Sangubanyu.

Results of Cycle 1

Following the first intervention, the results were:

1. 7 students (54.17%) still classified as not competent.
2. 6 students (45.83%) successfully met the competency criteria (competent).

Results of Cycle 2

In the second cycle, after implementing the rubber ball-based training approach, the findings showed:

1. 3 students (15.67%) remained not competent.
2. 10 students (84.33%) successfully achieved competency.

Conclusions

Based on the pre-test and post-test results across Cycle 1 and Cycle 2, a significant improvement in underhand service proficiency was observed. The study findings indicate the following trends:

1. The "very low" category showed marked improvement.
2. The "poor" category demonstrated progression toward higher competency levels.
3. The "good" category exhibited a notable increase.
4. The "very good" category improved from very low to low.

From a pedagogical perspective, the adoption of rubber balls as a teaching tool proved to be a strategic and effective approach for enhancing underhand service skills among elementary school students. This method not only fosters technical skill development but also creates an engaging and enjoyable learning experience, ultimately supporting broader educational objectives in physical education.

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