

**The Effect of Modified Volkraw Games on the Learning Outcomes of Fifth Grade Elementary School Students**Lukman Firmansyah<sup>1\*</sup>, Agung Wahyudi<sup>2</sup><sup>12</sup>Physical Education for Elementary School, Faculty of Sports Science, Universitas Negeri Semarang, Indonesia**Keywords**Game modification;  
Volkraw; Volleyball**Abstract**

The study was motivated by the low ability of students to perform basic volleyball skills, especially the underhand pass, which is influenced by a learning process that tends to be less varied and less engaging. Therefore, an innovation in learning is needed through simpler and more enjoyable game modifications suited to elementary school students. This study aims to examine the effect of modified Volkraw games on the learning outcomes of fifth-grade students at Sekaran State Elementary School 02 in Physical Education, particularly in volleyball material. This research employed a quantitative experimental approach using a one-group pre-test-posttest design. The participants consisted of 20 fifth-grade students of Sekaran State Elementary School 02. The instrument used was a learning outcomes assessment sheet covering psychomotor, cognitive, and affective aspects. Data were collected through tests and observations, then analyzed using IBM SPSS Statistics, including normality and homogeneity tests, as well as hypothesis testing with a paired-samples t-test. The results showed that the average pretest score was 20.90, which increased to 32.20 in the posttest. The paired-samples t-test produced a significance value of 0.000 ( $p < 0.05$ ), indicating that the modification of the Volkraw game had a significant effect on students' learning outcomes. Based on these findings, it can be concluded that the implementation of modified Volkraw games is effective in improving volleyball learning.

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## INTRODUCTION

Education is a key factor in advancing a nation and improving its quality of life. Education is understood as a conscious and planned effort to create a character, a learning atmosphere, and a learning process that enables students to develop their potential actively, enabling them to possess spiritual and religious strength, self-control, personality, intelligence, noble character, and the skills necessary for themselves, society, the nation, and the state (Keban, 2022). One area of learning that contributes significantly to this is physical education, which is not only focused on improving physical fitness but also helps develop character values, discipline, cooperation, and a healthy lifestyle (Kumari & Sharma, 2025). Through physical education, students acquire not only skills related to their activities but also the skills and values inherent within them.

Physical education encompasses a variety of activities systematically designed to develop physical abilities, motor skills, and healthy attitudes and habits (Mustafa & Dwiyojo, 2020). Through sports activities, students are not only trained in their physical abilities and motor skills but also develop social, emotional, and character values such as cooperation, sportsmanship, and discipline (Sari et al., 2024; Hidayatullah., 2023). One sports game widely taught in physical education in schools is volleyball, which has diverse movement characteristics and demands coordination, strength, and teamwork, making it relevant to supporting the achievement of physical education goals (Stojanović et al. 2023; Rahmat et al. 2025).

Volleyball has diverse movement characteristics and demands coordination, teamwork, and basic skills such as serving, passing, and smashing (Raihanati & Wahyudi, 2020). Through volleyball, students can develop motor skills, physical fitness, and social skills through game activities that involve student interaction (Daryono et al. 2025; Hardika 2022). One of the most important basic movements in volleyball is the underhand pass, as it serves as the initial step in receiving serves or opponent attacks and controlling the ball to pass to teammates.

However, volleyball instruction in elementary schools often encounters various obstacles, such as low student engagement and suboptimal utilization of available learning media (Amiruddin, Nurdin, and Sabilla 2024). Many students experience difficulty performing basic movements, particularly poorly directed underhand passes and serves, and a lack of teamwork during play. Such conditions can easily cause lack of student self-esteem, participation in learning and Learning outcomes. Besides, the conventional and commonplace learning method may equally cause students to be less interested in following Physical Education lessons (Laksono, Puspodari, and Kurniasari 2025).

To address these issues, it is necessary to implement innovative learning strategies that align with the developmental characteristics of elementary school students. One approach that can be implemented is game modification as a form of pedagogical adaptation. This modification includes adjusting game rules and equipment use, as well as the size of the playing field or area to suit the students' abilities and developmental stage. Through this approach, the learning process is expected to be easier to understand, more enjoyable, and able to increase students' active participation in learning activities (Atmko & Hidayat, 2024).

Volkraw is a modified form of volleyball that can be applied in volleyball learning. According to Wulandari et al., (2021), Volkraw integrates elements of volleyball and sepak takraw, providing a more engaging and accessible playing experience for students. This simplified version of the game features several adjustments, such as reducing the number of players, simplifying court size, and incorporating variations in basic techniques, such as underhand and overhand passes, into game situations. These adaptations are designed to simplify the mastery of basic volleyball skills, enabling students to be more actively involved and participate in the learning process (Putra & Sistiasih, 2021).

Previous research has shown that game modifications in learning can improve student motor skills and learning outcomes (Setiawan & Wahyudi, 2021). Research conducted by Showab and Djawa (2021) found that modifications to volleyball games in physical education lessons can increase students' active engagement and facilitate their understanding of basic game movements. Although various studies have shown that game modifications can improve student participation and motor skills in physical education lessons, research on the use of

Volkraw as a learning medium to enhance volleyball learning outcomes among elementary school students remains limited. Therefore, this study is important for determining the effectiveness of Volkraw in improving student learning outcomes in volleyball, particularly in underhand passing skills.

Based on this description, this study aims to determine the effects of Volkraw game modifications on the learning outcomes of fifth-grade students in Physical Education, Sports, and Health at Sekaran State Elementary School 02.

## METHODS

This study employed a quantitative, descriptive experimental design. The design employed was a Pre-Experimental Design. In this design, subjects were randomly assigned to two groups: an experimental group that received a modified Volkraw game treatment and a control group that received conventional volleyball instruction. After treatment, both groups were given a test to assess differences in learning outcomes.

This research was conducted at Sekaran 02 Public Elementary School, Gunungpati District, Semarang City. The subjects were fifth-grade students enrolled in Physical Education, specifically volleyball. The population included all fifth-grade students at the school. The sampling technique used was total sampling, resulting in a sample size of 20 students.

The research instrument used was a student learning outcome assessment sheet that covered three main aspects: psychomotor, cognitive, and affective. The psychomotor aspect assessed students' motor skills in performing basic Volkraw techniques, such as underhand passes, as well as combinations of locomotor and manipulative movements (e.g., running while carrying the ball), including serving skills over the net. The cognitive aspect measured students' understanding of the rules of the Volkraw game, the benefits of physical activity, and the movement concepts applied in the game. Meanwhile, the affective aspect aimed to assess students' attitudes during the game, such as sportsmanship, teamwork, and independence in action. The scores from these three aspects were then summed and classified based on the assessment criteria presented in Table 1 in the following section.

**Table 1.** Assessment Criteria (Depdiknas, 2007)

| Percentage | Score Range | Classification Underhand Pass |
|------------|-------------|-------------------------------|
| 80-100     | 29-36       | Very Good                     |
| 69-79      | 25-28       | Good                          |
| 56-65      | 20-24       | Moderate                      |
| 41-55      | 15-19       | Poor                          |
| 0-40       | 0-14        | Very Poor                     |

Data collection in this study was conducted through tests and observations. Before implementing the learning using the Volkraw game modification, a pretest was conducted to determine students' initial abilities in volleyball skills, followed by a posttest after the treatment. Data analysis was carried out using SPSS version 25.0, first by conducting normality and homogeneity-of-variance tests (a more detailed explanation is provided in the statistical analysis section). Hypothesis testing in this study used a paired sample t-test to identify differences in student learning outcomes before and after treatment.

## RESULTS AND DISCUSSION

This study aims to analyze the effect of implementing the Volkraw modification game on the learning outcomes of fifth-grade students in Physical Education at Sekaran 02 Public Elementary School. This study used a pretest–posttest design with a single group, in which the initial measurement (pretest) was conducted before the treatment and the final measurement (posttest) was conducted after the treatment. Furthermore, the research data were analyzed using IBM SPSS Statistics to obtain accurate, objective conclusions.

**Table 2.** Descriptive Statistics of Student Learning Outcomes

| Variable  | N  | Mean  | Std. Dev | Description |
|-----------|----|-------|----------|-------------|
| Pre-Test  | 20 | 20,90 | 3,837    | Moderate    |
| Post-Test | 20 | 32,20 | 3,088    | Very Good   |

Table 2 shows that the average student learning outcome score on the pretest was 20.90, while it was 32.30 on the posttest. This indicates that student learning outcomes improved after treatment with the modified Volkraw game.

The normality test was conducted to determine whether the research data were normally distributed. The normality test in this study used the Shapiro-Wilk test because the sample size was less than 50. The results of the normality test are shown in the following table.

**Table 3.** Normality Test.

| Variable  | Statistic | Sig.  |
|-----------|-----------|-------|
| Pre-test  | 0,924     | 0,119 |
| Post-test | 0,914     | 0,077 |

Based on the results of the normality test in Table 3, the significance value for the pretest variable was 0.119 and for the posttest variable was 0.077. Both values are greater than 0.05 ( $p > 0.05$ ), thus concluding that the pretest and posttest data are normally distributed. Therefore, the assumption of normality in this study has been met, and the data is suitable for use in further parametric statistical analysis.

**Table 4.** Homogeneity Test

| Variable               | Levene Statistic | Sig. Value | Description |
|------------------------|------------------|------------|-------------|
| Pre-test and Post-test | 1,600            | 0,214      | Homogeneous |

Based on the homogeneity test results in Table 4, the Levene Statistic value was 1.600 with a significance value of 0.214. Because this value is greater than 0.05 ( $p > 0.05$ ), it can be concluded that the variance of the pretest and posttest data is homogeneous. Thus, the homogeneity assumption in this study has been met, allowing the data to proceed to the hypothesis testing stage.

**Table 5.** Hypothesis Testing

| Variable               | Mean Difference | t       | Sig.(2-tailed) |
|------------------------|-----------------|---------|----------------|
| Pre-test and Post-test | -11,300         | -20,092 | 0,000          |

The table analysis shows a mean difference of -11.300, indicating an increase in scores from the pretest to the posttest. The paired-samples t-test results show a p-value of 0.000. Because the significance value is less than 0.05,  $H_0$  is rejected, and  $H_1$  is accepted. Thus, it can be concluded that the modified Volkraw game has a significant effect on the learning outcomes of fifth-grade students in Physical Education at Sekaran State Elementary School 02.

A large distinction between the pretest and posttest following the modified Volkraw game was seen in an analysis of this. There was a also statistically significant difference between the pretest mean score (20.90) and posttest mean scores (32.30),  $t = 11.300$ ,  $p < .01$ .

The results of the paired-samples t-test showed a significance value of 0.000 ( $\text{Sig} < 0.05$ ). This indicates a significant difference between learning outcomes before and after the treatment. Therefore, it can be concluded that implementing the modified Volkraw game significantly improved the learning outcomes of fifth-grade students in Physical Education, Sports, and Health at Sekaran State Elementary School 02. Volkraw aligns closely with improving student learning outcomes, as it combines elements of volleyball and sepak takraw. Various adjustments, such as the number of players, court size, rules, and movement variations, simplify learning and align it with the developmental stage of elementary school students. This helps students more easily understand and master basic skills, particularly the underhand pass technique. With a more focused practice space and more flexible game

formats, students can practice more confidently and effectively according to their individual abilities.

Furthermore, Volkraw also creates a more lively and engaging learning environment. Learning structured as a game encourages students to be more actively involved in class. Similarly, Amanullah et al. (2022) explain that game-based learning can increase student motivation and active participation. In this context, students are not simply playing; they are also encouraged to repeat and refine basic skills, such as underhand passes, while learning to work together as a team. This reinforces the view that modified games in Physical Education can increase student engagement and help them gradually develop movement skills in line with their developmental level.

From a psychomotor perspective, Volkraw provides students with the opportunity to learn through hands-on practice in game situations that mimic real-life conditions. In this activity, students coordinate locomotor and manipulative skills, such as running after the ball, adjusting hand position when throwing or catching, and following specific movement cues (e.g., an underhand pass). These activities not only reinforce basic skills but also gradually and enjoyably improve coordination, agility, and ball control. In addition to psychomotor aspects, Volkraw-based learning also engages cognitive processes. Students learn to understand the rules of the game, the concept of movement in sports, the relationship to energy systems, and the health benefits of physical activity. Furthermore, from an affective perspective, this method fosters sportsmanship, teamwork, and self-confidence, although the process takes time. This demonstrates that game modifications not only aim to improve motor skills but also serve as an effective way to balance the development of attitudes and knowledge in Physical Education learning.

This is consistent with research by Kartiko (2021), which states that the implementation of game modifications in Physical Education learning affects student learning outcomes as well as motor skills significantly positively. In addition, game modifications offer a more personalized, flexible-contextual and enjoyable learning experience. This is especially true for students in elementary school as they are often active learners who can be easily drawn into play-based learning situations (Showab & Djawa 2021).

Thus, it can be concluded that implementing the Volkraw modification game affects the learning outcomes of fifth-grade students at Sekaran 02 State Elementary School. This game can serve as an alternative learning strategy for Physical Education teachers in teaching volleyball, especially the underhand passing technique, making the learning process more fun, dynamic, and meaningful for students.

## CONCLUSION

Based on the study's results, the modified Volkraw game is effective in improving the learning achievement of 5th-grade students at Sekaran 02 Elementary School in the subject of Physical Education. This is indicated by an increase in the average score from 20.90 in the pretest to 32.20 in the posttest, as well as by the results of the paired t-test, which showed a significant difference ( $p < 0.05$ ) with a value of 0.000. In addition to improving learning outcomes, the Volkraw game has been proven to create a more engaging and enjoyable learning environment, encouraging students to be more active, confident, and involved in the learning process, especially in mastering basic volleyball techniques such as underhand passing. Thus, this game modification can serve as an effective learning strategy for teachers to increase students' interest, participation, and motor skills, and can be adapted to students' characteristics and abilities in elementary schools.

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