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## Learning outcomes of basic volleyball techniques through traditional and regional sports

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### Abstract

This research aimed to determine the factors and results of the influence of using traditional game methods on the learning outcomes of volleyball games. The traditional game method used in this research was a 2 x 2 factorial design. The research population was SMA Negeri 1 Porwodadi class 11, totaling 32 male and female students. The sample was obtained randomly and divided into two experimental groups. This consisted of 32 students. The data were obtained through five kinds of volleyball playing skills tests. This research concluded that (1) modification of learning media has a significant effect when compared to modification of volleyball game rules, (2) between modification of learning media and gender, there is a significant interaction, and (3) for male students, modification of learning media has a more significant effect when compared to traditional game methods in volleyball games, and (4) for students, traditional game methods have a more significant effect when compared to other rule methods in volleyball games.

### Keywords

Regional sport, traditional game method, volleyball learning outcomes

### Article History

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## Introduction

Schools view physical education as a crucial tool for accomplishing their overall teaching and learning objectives (Batiurata et al., 2023). Volleyball is one of the sports included in the subject matter of physical education (Aryanata et al., 2020). Kurniawati et al. (2022) revealed that volleyball is popular in the community, from the upper to the lower classes. Often found in certain areas, this volleyball game is played by many people, both children and adults. Playing volleyball offers many benefits, such as improving body posture and enhancing anatomical, physiological, and health and physical abilities. The benefits for the spirit are psychology, personality, and character, which will grow in the direction in accordance with the demands of society (Bryndin, 2018).

The motion activity of learning volleyball games is a means of physical education to achieve the expected goals. Wibisono (2025) revealed that students must acquire the skills necessary to play volleyball, including lower passing, upper passing, smashing, serve, and block. When teaching volleyball, instructors need to guarantee that students are actively involved. The basic volleyball techniques taught at school can be an early stage of coaching. Volleyball learning in schools aims for students to reach the expected peak of achievement (Akhmad et al., 2021). Achieving this goal requires learning that is both motivating for students and engaging and enjoyable. However, volleyball learning still experiences many internal and external obstacles (Purba et al., 2025).

The problems that often arise in learning volleyball games in schools are limited facilities and infrastructure (Qurrahman et al., 2025). The practice of learning volleyball at school has not been maximized in its application. The educational process at the basic level greatly determines exposure to sports achievements (Bailey, 2017). During game learning, teachers often focus their learning on how students display skills in the game (learning skills). It would be better if teachers focused their learning on how students display beneficial basic techniques using methods that match what is later expected. This factor makes the actual learning process of game strategies complex for students to accept, because these strategies are usually complex. For this reason, learning strategies should be implemented in stages from simple to complex. This strategy is the basis for students to play in complex conditions and develop various game patterns at a more advanced stage.

One method that can be used to improve learning quality is to use traditional game methods. Traditional game methods allow students to participate and be happy and passionate about physical lessons actively, especially in the learning process of volleyball games (Pebrisen et al., 2025). Kale et al. (2025) said implementing the traditional game map of numbers improves students' basic locomotor movement skills, especially jumping. Through this modification, students' freedom of movement will not be limited; it will increase their repertoire of movements, thus supporting efforts to develop their volleyball skills. Furthermore, Leisterer and Jekauc (2019) revealed that involvement in various physical activities will cause students to be able to accept a variety of different perspectives, understand other people's emotions, control aggressiveness, and prioritize the interests of others.

Based on the literature review and problems regarding learning outcomes in volleyball games, the researchers researched traditional game methods that also require learning media

and are modified with the rules of volleyball games used to teach basic volleyball technical skills for students. The purpose of this research is to emphasize the techniques that have been modified both in the learning media and the rules of the game so that students can feel more motivated and more stimulated in the learning process of volleyball games, especially in the environment of SMA Negeri 1 Porwodadi, through traditional games carried out.

## Literature Review

### *The role of physical education and sports in developing basic skills*

Physical education plays a crucial role in the overall educational process, encompassing the physical, mental, social, and emotional development of students. According to [Adeyemo \(2010\)](#), student involvement in physical activity directly contributes to academic achievement and character development. In the school context, physical education is not merely a means of recreation or physical activity, but also a medium for learning life values, developing motor skills, and fostering personality development. In other words, physical education serves as a comprehensive and holistic learning vehicle.

Sports, particularly volleyball, are one of the subjects frequently used to achieve physical education goals. [Chuang et al. \(2022\)](#) emphasized that learning basic volleyball techniques can develop body coordination, strength, agility, and social skills through teamwork. Furthermore, [Xu \(2024\)](#) highlighted the psychological aspects gained through sports learning, such as developing personality and character that align with societal demands. Thus, the role of physical education through sports places students in an active learning environment that not only builds physical health but also internalizes moral and social values.

[Khudair et al. \(2022\)](#) found that volleyball's popularity among the community makes it a strategic learning tool. However, the effectiveness of volleyball heavily relies on the teaching strategies teachers employ. If teachers can create a fun and motivating learning environment, then learning the sport's basic techniques can have a significant impact on student development. Therefore, physical education through sports serves as a medium for motor skills and builds discipline, sportsmanship, responsibility, and a spirit of cooperation in everyday life.

### *Learning basic volleyball techniques in schools and its challenges*

Learning basic volleyball techniques in schools often faces various challenges, both internal and external. [Karisman and Supriadi \(2022\)](#) emphasized that basic skills such as underhand passing, overhand passing, serving, smashing, and blocking are essential elements that students must master to play volleyball well. However, achieving these skills is not easy due to various limitations. For example, [Gutema \(2017\)](#) stated that lacking facilities and infrastructure often hinders volleyball learning. This prevents students from achieving the maximum learning experience. In addition to limited facilities, teaching methods are also a crucial factor. Teachers who focus solely on the result, namely student performance in the game, without considering the gradual learning process, will make it difficult for students to understand complex game strategies. Therefore, learning strategies should be implemented

in stages, progressing from simple to more complex skills (Baldwin-Evans, 2006). This way, students have a strong foundation of skills before being guided to master more complex game strategies.

Another challenge is student motivation, which often declines due to perceived monotony in learning. Cavanagh (2011) explained that a lack of varied learning experiences can reduce students' interest in active participation. This emphasizes the need for creative approaches, such as modifying learning media and game rules, to make volleyball learning more engaging. Therefore, despite the various challenges in teaching basic volleyball techniques, teachers can overcome them by employing innovative and creative learning strategies tailored to the characteristics of their students.

### ***Traditional game methods as an innovative strategy in learning***

One innovative approach that can be used in volleyball learning is integrating traditional game methods. Traditional games have cultural value and support the development of students' motor skills. According to Simón-Chico et al. (2023), implementing traditional games in physical education lessons can increase student engagement, make learning more enjoyable, and foster intrinsic motivation. This aligns with the findings of Rivera-Pérez et al. (2021), who stated that involvement in various physical activities can improve students' abilities in managing emotions, empathy, and cooperation.

Irawan et al. (2021) showed that traditional games, such as number maps, can improve basic locomotor skills, particularly jumping movements, which are relevant to volleyball skills. Therefore, integrating traditional games into volleyball learning improves technical aspects and provides space for students to be creative and explore. Furthermore, traditional games also serve as a means of cultural preservation. Dezfoulian and Nemati (2025) emphasized that traditional games are expressions of authentic culture that contribute to national identity. Therefore, the application of this method not only impacts the learning aspect and contributes to efforts to preserve the nation's cultural heritage.

Traditional game methods are also relevant to modern pedagogical approaches in the context of learning. Lodewyk (2015) explained that traditional games provide epistemological, pedagogical, and didactic contributions to physical education. Epistemologically, these games enable students to understand the relationship between human movement and cultural and social contexts. Pedagogically, traditional games provide new options in curriculum design. Didactically, these games generate a variety of learning resources that can enrich students' experiences. Thus, traditional game methods are an innovative strategy with significant potential for improving the quality of volleyball learning in schools.

### ***The impact of traditional games on student motivation, motor skills, and learning outcomes***

The use of traditional games in volleyball learning has a significant impact on student motivation, motor skills, and learning outcomes. Aliriad et al. (2024) found that implementing traditional games increased student motivation and provided hands-on experience developing motor skills, coordination, speed, and strength. This aligns with Purnama et al. (2024), who

demonstrated that the traditional Betengan game contributes to increased VO2 max, an important indicator of physical fitness.

In addition to physical aspects, traditional games also have a socio-emotional impact. [Gultom et al. \(2022\)](#) explained that the rules in traditional games are closely related to local culture and encourage students to understand social values such as cooperation, sportsmanship, and discipline. [Muliadi et al. \(2024\)](#) added that traditional games can be a medium for building character and preserving local wisdom while providing a fun learning atmosphere. Therefore, implementing traditional games is an alternative medium and an effective means to support character learning.

Furthermore, [Riyadi and Sulaiman \(2021\)](#) confirmed that the traditional game Gobak Sodor has been proven to improve students' physical fitness. This positive impact indicates that traditional games can be a practical approach to improving school sports learning outcomes. By combining cultural, physical, social, and cognitive aspects, traditional games serve as a comprehensive strategy that not only improves mastery of basic volleyball techniques but also fosters motivation, character, and an understanding of national values in students.

## Methodology

This research employed an experimental method using a 2x2 factorial design, which allows researchers to examine the main effect of each independent variable and their interaction effect on the dependent variable. This design was considered the most appropriate because the research focused on comparing the impact of two types of modifications- learning media modification and game rule modification-while also considering gender differences. The factorial design thus provided a comprehensive framework to capture the complexity of how these variables interact in shaping students' volleyball learning outcomes.

The research population consisted of all grade 11 students at SMA Negeri 1 Purwodadi, and a random sampling technique was employed to ensure that every student has the same opportunity to be selected. Randomization is important in experimental research to reduce bias and enhance the internal validity of the findings. Meanwhile, the sample was 32 people; the sample selection technique was done through random techniques, namely, SMA Negeri 1 Purwodadi students. The instrument used in this research was mastery of learning modifications, using volleyball game skill tests. This test consisted of four types of tests, namely: (1) serve test; (2) pass test; (3) block test; and (4) spike test. This test has been approved, and statistical calculations from testing show a reliability value of 0.94 and a validity of 0.84. The technique used in analyzing data was two-way analysis of variance. Before arriving at the research hypothesis testing, it was necessary to test the requirements first. Variance homogeneity was performed using the Bartlett test, and normality testing was performed using the Lilliefors test. All analysis tests were seen at a significant level = 0.05.

## Results

The results of the pre-test normality test of volleyball learning outcomes between groups A and B are normally distributed. They indicated that the significance value (Sig.) exceeds 0.05; group A has a pre-test value of 0.200, and group B also has a pre-test value of 0.200, meaning that all data in these two groups are normally distributed.

**Table 1.** Results of the normality test of initial mastery scores (pre-test)

No	Data	Asym. Sig	A	Information
1	Pre-test of group A	0.200	0.05	Normal
2	Pre-test of group B	0.200	0.05	Normal

**Table 2.** Results of the homogeneity test of the initial test mastery scores for learning outcomes

Data	Asymp. Sig.	A	Information
Pre-test of group A and B	0.495	0.05	Homogeneous

The results of the pre-test homogeneity test of volleyball learning outcomes between groups A and B are normally distributed. The homogeneity test results show that the pre-test data have a significant value  $> 0.05$ . Based on the pre-test homogeneity test table for groups A and B, with a value of  $0.495 > 0.05$ , the homogeneity test results of the pre-test data for groups A and B are homogeneous.

**Table 3.** Results of the pre-test difference test for volleyball learning outcomes in group A with media modification

Data	T-count	Df	T-table	Sig.	Information
Pre-test of learning outcomes of volleyball serves in groups A and B	0.53747	38	2.022	0.0495	There is no difference

Table 3 indicates that the average difference in the pre-test learning outcomes of volleyball serves between group A, which used modified learning media, and group B, which followed modified game rules, resulted in a p-value (Sig. (2-tailed)) of 0.53747 at a significance level of 0.05. Therefore, at the 95% confidence level, there is no significant difference in the average pre-test learning outcomes of volleyball serves between group A, which used modified learning media, and group B, which used modified game rules. Therefore, according to Table 3, the volleyball serves learning test results indicate no difference between the group using learning media for volleyball servers and the group that modified the game rules, suggesting that both methods are equally effective in the learning process. Table 4 outlined the deviation value of students' abilities on the five referred volleyball game skills items.

**Table 4.** Differences in service ability in students between group A and group B, paired samples statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 learning media modification game rule	12.6500	20	1.59852	35744
modification	11.0500	20	2.39462	53545

Table 4 shows that the group receiving the media treatment scored 12.65. Meanwhile, the group with modified game rules scored 11.05. The data can proceed to the following processing stage, and based on the values in Table 4, there is no significant difference between the group with media modification and the group with modified game rules, indicating that both metrics are equally effective.

**Table 5.** Differences in service ability in students between group A and group B paired samples test

Pair 1 media modification learning-method rules game	Paired Differences				t	Df	Sig. (2-Tailed)
	Mean	Std. Deviation	Std. Error Mean	95% confidence interval of the difference			
				Lower Upper			
	1.60000	2.56289	57308	40053 2.79947	2.792	19	012

Based on the output in Table 5, the sig value is obtained. The 2-tailed significance value of 0.012, less than 0.05, indicates a difference in the serving ability between Group A and Group B students. Therefore, there is a difference in serving ability between students who received modified learning media treatment in volleyball games.

**Table 6.** Differences in students' upper passing ability between group A and group B paired samples test

Pair 1 media modification learning-modification of rules game	Paired differences				t	Df	Sig. (2-Tailed)
	Mean	Std. Deviation	Std. Error Mean	95% confidence interval of the difference			
				Lower Upper			
	2.75000	3.90512	87321	4.57765 92235	3.149	19	005

The results obtained in table 6 regarding the difference in students' upper passing ability between group A with the modified learning media method and group B with the modified game rules obtained sig results ( $0.05 \leq 0.05$ ), which means that there is no difference or the same between students with the learning media modification group and the modified group of game rules for volleyball upper passing ability. Therefore, it can be concluded that there is no difference in the upper passing ability between the two groups: one using modified learning media and the other using modified game rules in volleyball.

## Discussions

The research results illustrate the difference in the effect on learning outcomes of volleyball games between students taught through traditional game methods and modified learning media. The traditional learning game method contributes to efforts to improve the ability to understand volleyball games developed by teachers. It is based on real experience in that it connects learning materials with student activities in the school and community. Cowan (2014) emphasized that memory development, attention, and reasoning involve learning to use existing tools, knowledge, and understanding; they are constructed when a person is involved in traditional learning game methods and gender. Safitri et al. (2024) explained the effect of traditional *Hadang* games on agility in the women's volleyball extracurricular activities of SDN 01 Negarayu. The effect of traditional *Hadang* games using the traditional *Hadang* game training method is significantly increased. Traditional games are a form of game and/or sports activity that develops from a particular community habit. In its implementation, traditional games can include elements of folk games and children's games (Ospankulov et al., 2023).

Ribas et al. (2023) discussed traditional sporting games and their applicability to physical education by proposing, on one hand, more specific goals for game options, and on the other hand, a network model of play intentions to understand game dynamics and to design learning tasks. Groll et al. (2015) revealed that traditional games and sports are original cultural expressions and ways of life that contribute to the general identity of humanity and have disappeared; those that still survive are also threatened with disappearance or extinction due to the influence of globalization and harmonization of the diversity of world sports heritage. Traditional sports are the cultural heritage of the Indonesian nation, which can be an encouraging tool for students in improving their physical motor abilities and developing their gross and fine motor skills (Sudardiyono et al., 2021). According to Gusril et al. (2022), the implementation of traditional games in PJOK learning has the effect of increasing student.

Martínez-Santos et al. (2020) stated that traditional sporting games, those activities collected, constitute a significant asset for physical education (PE) in at least three ways: epistemologically, they allow us to think about what human action and motricity are in relation to culture, history, and society; pedagogically, they let us consider what our options are when proposing aims and designing curricula; and didactically, they impel us to question what our resources can be when teaching in PE and sports. In the learning process, teachers use traditional games in PE learning, so that the learning process is more varied and that students are not bored when the learning process occurs (Ujiana et al., 2023). Rahail et al. (2023) explained that the methods and models of physical education learning processes that are interesting, fun, and encouraging are in play using materials and studies from nature, namely, traditional sports. Traditional games can have an excellent impact in helping to develop children's emotional and social skills in volleyball learning.

Kogoya et al. (2023) revealed that Indonesia is rich in various games and sports activities in society, known as traditional games. In developing the value of peace in sport, health, and physical education lectures through traditional games, many character values have the potential to be used as a means of building students' peace-loving character values. Aliriad (2024) found

that the traditional game approach significantly increased students' motivation to learn physical education. The traditional games approach also contributed positively to students' learning outcomes. Through hands-on experience in these traditional games, students can develop motor skills, coordination, speed, strength, and cognitive aspects such as strategy, spatial intelligence, and situation analysis. Nurcahya (2023) stated that traditional *Betengan* sports significantly affect VO2 max. This traditional sport of *Betengan* games can be used by other clubs to increase the VO2 max of volleyball players.

Lavega-Burgués et al. (2023) stated that the traditional sporting game (TSG) deserves special attention among the possible pedagogical resources. The rules are linked to the local culture, and, unlike sports, they are not governed by an institution or federation (they are not institutionalized). This definition of sport stretches beyond traditional team games. It incorporates 'individual sports and fitness-related activities such as aerobics and certain dance activities, as well as recreational activities such as long walks and cycling' (6). Notions of expression, improvement (i.e., effort/practice), and recognition of the social dimension of sport are evident. Salim et al. (2025) explained that traditional games such as *Gobak Sodor* are fun and have benefits in improving children's physical fitness.

## **Conclusion**

Based on the research results, it can be concluded that using traditional games positively influences volleyball learning outcomes, indicating that students who use learning media master basic volleyball techniques more quickly than those who only receive instruction on volleyball game skills. The traditional game method better influences the learning outcomes of volleyball games, meaning that students who are given the basic techniques of volleyball game skills using traditional game methods can provide better learning outcomes. The results are expected to be applied in school learning, in volleyball learning in particular, and in other learning in general. Some teachers have been unable to maximize traditional learning that is easy and can be understood and applied at school for some students.

## **Disclosure statement**

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