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Effectiveness of Implementing the STAD Type Cooperative Learning Model Through Modifying Net and Field Media on the Volleyball Learning Outcome

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Abstract

This study aims to determine the effectiveness of the implementation of the Student Teams-Achievement Divisions (STAD) cooperative learning model through modifications to the net and field media on the volleyball learning outcomes of junior high school students in Cimahi City. The research method used a quasi-experimental design with a pretest-posttest control group design approach. The study population was 60 students with a sample of 60 people using a total sampling technique, divided into an experimental group (n = 30) and a control group (n = 30). The research instrument used a volleyball skills test covering passing, serving, and playing with high validity and reliability (α = 0.89). The data analysis technique used a paired t-test and an independent t-test with α = 0.05. The results showed a significant increase in the experimental group from an average of 65.23 to 82.67. while the control group from 64.87 to 72.43. The independent t-test showed a significant difference (t=7.896; with a difference of 10.24 points. It can be concluded that the STAD learning model through net and field media modifications is effective in improving volleyball learning outcomes for junior high school students in Cimahi City.

Keywords: STAD, Cooperative Learning, Media Modification, Volleyball, Learning Outcomes, Physical Education

INTRODUCTION

Physical education is an integral part of the education system, aiming to develop psychomotor, cognitive, and affective aspects through physical activity. states that physical education is a learning process through physical activity to improve fitness, develop motor skills, knowledge, and healthy lifestyle behaviors (Samsudin, 2018). Volleyball, as part of the curriculum, requires a good mastery of basic techniques for success.

Volleyball as a team game played by two teams on a court separated by a net, each with six players. Mastery of basic techniques such as serving, passing, smashing, and blocking is crucial for success(Ahmadi, 2017). However, initial observations at junior high schools in Cimahi City indicate low volleyball learning outcomes, characterized by a lack of mastery of basic techniques, low motivation, and ineffective conventional learning methods. Explains learning outcomes as changes in individuals encompassing knowledge, skills, habits, and mastery (Slameto, 2010). To improve learning outcomes, innovation in learning methods is necessary.

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The cooperative learning model is an alternative that emphasizes student collaboration. States that cooperative learning is a model where students learn collaboratively in small groups of 4-6 people with a heterogeneous structure (Slavin, 2015b). Effective physical education learning must be inclusive, joyful, and provide successful experiences to all students, regardless of their initial ability level (Dudley, 2015). Low learning outcomes for underhand serve and passing in volleyball are often caused by the complexity of motor coordination, perception of ball trajectory, and fear of pain, especially in beginners (Gutierrez et al., 2020). Social Interdependence Theory is the basis for the success of cooperative learning, where interrelated group goals encourage mutually supportive behavior for shared achievement (W. Johnson & T. Johnson, 2019). STAD is not only effective for the cognitive domain, but also significantly improves the mastery of psychomotor skills in physical education due to the existence of peer tutoring mechanisms and structured team exercises (Hunuk, 2016). Modifications to equipment and rules (such as softer balls, lower nets, smaller courts) are based on the principle of 'developmentally appropriate practice,' which adapts task demands to the level of physical and cognitive development of students (Miller, 2015). "The lack of a variety of learning models and media that are adaptive to the characteristics of students in cities like Cimahi, which may have limited facilities but high social dynamics, is an important gap for researched (Saputra & Winarno, 2018).

Student Teams-Achievement Divisions (STAD) is a type of cooperative learning developed by Robert Slavin at Johns Hopkins University. States that STAD consists of five components: class presentations, teamwork, quizzes, individual progress scores, and team recognition (Slavin, 2015a). demonstrated that the STAD method is effective in improving student achievement, attitudes, and motivation (van Wyk, 2012). Modifying learning media is also important for improving learning outcomes. States that modification involves analyzing and developing material by sequencing potential learning activities to facilitate learning (Bahagia, 2010). Modifications to the net and field are tailored to the characteristics of junior high school students to make learning more engaging and facilitate mastery of basic techniques. Previous research supports the effectiveness of the STAD model. Demonstrated that STAD effectively improves volleyball learning outcomes for elementary school students (Purnawan et al., 2023). Demonstrated that the implementation of Tat Twam Asi-based STAD improved volleyball passing activity and learning outcomes (Artha et al., 2023). This study aims to determine the effectiveness of implementing the STAD cooperative learning model through net and

field modifications on volleyball learning outcomes for junior high school students in Cimahi City.

METHOD

This study used a quasi-experimental design with a pretest-posttest control group design. Sugiyono (2019) stated that quasi-experimental designs have a control group but cannot fully control for external variables.

Group	Pretest	Control	Posttest
Experiment	O_1	X	O_2
Control	O_3	-	O_4

Description: O_1,O_3=Pretest; O_2,O_4=Posttest; X=STAD Treatment with Media Modification

Population and Sample. The research population consisted of 60 Physical Education (PJKR) students. The sampling technique used total sampling, where the sample size equals the population (Sugiyono, 2019). The entire population of 60 students was randomly divided into an experimental group (n=30) and a control group (n=30).
The instrument . used volleyball skills tests including: (1) Passing Test (initial stance, execution, final result); (2) Serving Test (initial stance, execution, accuracy); (3) Game Test (technique mastery, cooperation, strategy). The maximum score for each was 100. The instrument was validated by three physical education experts with a Cronbach's alpha reliability of 0.89, a high category (Arikunto, 2013). Data analysis included descriptive (mean, median, standard deviation, minimum, maximum) and inferential analysis. Prerequisite tests used the Kolmogorov-Smirnov normality test and Levene's homogeneity test. Hypothesis testing used paired t-tests for pretest-posttest differences and independent t-tests for intergroup differences with α=0.05 using SPSS 25.

RESULTS AND DISCUSSION

Result

Tabel 1. Experimental Group Data Description

Statistik	Pretest	Posttest
Mean	65,23	82,67
Std. Deviasi	6,45	5,23
Minimum	52	72
Maksimum	78	93

Based on Table 1 regarding the description of the experimental group data, there is an increase in student learning outcomes from the pretest to the posttest. During the pretest, the experimental group obtained an average score (mean) of 65.23 with a standard

deviation of 6.45, a minimum score of 52, and a maximum score of 78. After being given the treatment, the posttest results showed a significant increase with the average score increasing to 82.67 and a standard deviation of 5.23. The minimum posttest score was 72 and the maximum score reached 93. The average increase from pretest to posttest of 17.44 points indicates that the treatment given to the experimental group had a positive impact on improving student learning outcomes. In addition, the decrease in the standard deviation from 6.45 to 5.23 indicates that the distribution of posttest data is more homogeneous than the pretest, which means that the abilities of students in the experimental group became more evenly distributed after being given the treatment.

Tabel 2. Frequency Distribution of Learning Outcomes of the Experimental Group

Score Range	Category	Pretest f(%)	Posttest f(%)
85-100	Very Good	0 (0%)	12 (40%)
70-84	Good	8 (26,7%)	15 (50%)
55-69	Fair	18 (60%)	3 (10%)
40-54	Poor	4 (13,3%)	0 (0%)
Amount		**30 (100%)**	**30 (100%)**

Table 2 shows a significant improvement, with 60% of students in the pretest being in the adequate category, while 40% were in the very good category and 50% were in the good category in the posttest. Normality and homogeneity tests were met ($p>0.05$), allowing for parametric testing.

Tabel 3. Independent t-Test Results

Group	N	Mean Posttest ($\bar{X}$)	Std. Deviation	t-value	p-value (Sig.)
Experimental	30	**82.67**	5.23	**7.896**	**0.000**
Control	30	72.43	6.78		

Table 3 shows a significant difference ($t=7.896$; $p<0.05$) with a difference of 10.24 points, proving that the STAD model through media modification is more effective than conventional learning.

Discussion

The results indicate that the STAD model through media modification is effective in improving volleyball learning outcomes, in line with (Purnawan et al., 2023).who demonstrated that STAD effectively improves learning outcomes and activities. This effectiveness is due to group collaboration, individual accountability, and healthy competition (Slavin, 2015b). A meta-analysis showed that cooperative learning is effective in the physical, cognitive, and social domains of physical education (Fernandez-Rio et al., 2024). Media modification makes a significant contribution. stated that modifications adapt material to student characteristics. Fani & Sukoco (2019) demonstrated that TGfU-based

learning media improves understanding and skills (Fani & Sukoco, 2019). Demonstrated that STAD improves achievement, attitudes, and motivation. Increased motivation is evident in the enthusiasm and active participation of the group. Support the importance of variations in physical education learning (Lubis & Agus, 2017).

The implementation of the Teaching Games for Understanding (TGfU) model significantly improves students' overall motor competence in volleyball learning, including locomotor and object control aspects, confirming the effectiveness of TGfU in developing students' physical abilities relevant to the objectives of PJOK learning (Apriani et al., 2025). The use of the TGfU model significantly improves both students' social and cognitive skills in physical education learning compared to conventional learning, demonstrating the holistic impact of TGfU on student development Pramudita (Pramudita et al., 2025). The Think-Pair-Share cooperative learning model effectively improves students' learning achievement in PJOK, both in terms of average grades and learning completeness, supporting the argument that a cooperative approach can improve students' understanding and performance in motor learning (Susila, 2022). The use of the cooperative learning model significantly increases students' active participation, learning motivation, and learning outcomes in PJOK subjects, strengthening the evidence that collaborative learning can build higher engagementin physical activities (Alwi et al., 2024). The implementation of the Jigsaw cooperative learning model increases student activity and learning achievement in learning variations of martial arts movements, showing that the group structure in cooperatives helps motor involvement and understanding of PJOK material (Wahyuningsih, 2021). Found that the implementation of TGfU has a positive effect on student learning interest in PJOK learning through an interesting and contextual game approach, which is in line with the focus on active involvement in sports learning (Glauca et al., 2025).

Found that cooperative learning improves students' social skills (Bagia et al., 2024). stated that cooperative learning models develop social responsibility and interpersonal skills (Casey & Goodyear, 2015). found that cooperative learning increases intrinsic motivation and learning independence (Dyson & Casey, 2016). This research demonstrates that STAD with media modifications holistically improves psychomotor, cognitive, and affective aspects. Shows that modifications to rules and media increase student participation and enjoyment (Baena-Extremera et al., 2020). Gil-Arias et al. (2017) found that task modifications improve technical and tactical skills. This research aligns with that the choice of learning model must be tailored to student characteristics and the material (Michael

Metzler, 2017). The combination of STAD with media modifications creates a conducive learning environment, significantly improving learning outcomes

CONCLUSION

Based on the research results and discussion, it can be concluded that the application of the STAD type cooperative learning model through net and field media modifications is effective in improving volleyball learning outcomes for junior high school students in Cimahi City. This is evidenced by a significant increase in the average of the experimental group from 65.23 to 82.67 and a significant difference with the control group ($t = 7.896$; $p < 0.05$). This model improves psychomotor, cognitive, and affective aspects holistically through group collaboration, individual responsibility, and media modifications that suit student characteristics. It is recommended that physical education teachers apply the STAD model with media modifications to improve learning outcomes, and further researchers develop research on different materials and levels.

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