

Implementation of the Cooperative Learning Model to Improve Forearm Passing Ability in Volleyball Among Students at SMP N 2 Purwanegara

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Abstract

This research aims to analyze the implementation of the Cooperative Learning Model in improving the mastery of forearm passing techniques in volleyball among eighth-grade students at SMP Negeri 2 Purwanegara. The main premise of the research is based on the need for physical education learning that not only emphasizes skill repetition but also involves interaction, cooperation, observation, peer feedback, and learning responsibility. The research uses an action research design implemented in two cycles through the stages of planning, action implementation, observation, and reflection. The research subjects consisted of 32 eighth-grade students. Data were collected through attitude observations, knowledge tests, and forearm passing performance assessments. Data analysis included descriptive statistics, classical mastery percentage, percentage improvement, N-Gain, Shapiro-Wilk normality tests and paired-samples t-test. The results showed that the mean knowledge score increased from 67.81 in Cycle I to 82.81 in Cycle II, while classical mastery increased from 31.25% to 84.38%. In the skill domain, the mean score increased from 56.45 to 86.52, representing a 53.29% improvement, accompanied by a positive shift in skill categories and the absence of students in the Poor category in Cycle II. The mean attitude score increased from 78.32 to 83.98, while the proportion of students in the Very Good category increased from 9.4% to 28.1%. Paired-samples t-tests showed significant differences between Cycle I and Cycle II in the knowledge, attitude, and skill domains ($p < .000$). N-Gain analysis indicated moderate improvement in knowledge (0.51) and high improvement in skills (0.71). Thus, the action hypothesis was accepted, indicating that the implementation of the Cooperative Learning Model was associated with meaningful improvements in volleyball forearm passing and supported positive development across cognitive, affective, and psychomotor learning outcomes.

Keywords: cooperative learning, forearm passing, volleyball, learning outcomes, action research.

INTRODUCTION

Physical education is an integral part of the educational process that is not only oriented toward improving physical fitness but also toward the development of motor skills, knowledge, attitudes, social abilities, and meaningful learning experiences. The development of pedagogical approaches in physical education shows a shift from teacher-centered learning to learning that provides greater space for student participation, interaction, decision-making, and responsibility. In this context, Cooperative Learning has developed into one of the pedagogical models with a strong empirical basis in physical education, alongside Sport Education and Teaching Games for Understanding (Álvarez-Sánchez et al., 2026). Umbrella studies on pedagogical models also show that the application of student-centered models can have a more integrated impact on cognitive, social, physical, and affective domains compared to learning that is solely oriented toward skill reproduction (Fernandez-Rio & Iglesias, 2024). In Indonesia, the implementation of model-based practice in physical education is also starting to develop, although its utilization is still concentrated on certain models and learning objectives (Gustian et al., 2024). Recent reviews likewise document the continuing development of pedagogical models in physical education and support the use of model-based approaches as an evidence-informed direction for teaching practice (Arufe-Giráldez et

al., 2023). The relationship between Sport Education and Cooperative Learning further shows that cooperative principles can operate within broader model-based practice rather than only as an isolated instructional strategy (Fernandez-Rio & Casey, 2021). Students' experiences with hybridized pedagogical models also indicate that combining complementary model features can contribute to active and meaningful learning identities (Evangelio et al., 2022).

One of the physical education subjects that requires the integration of motor skills, technical understanding, communication, and cooperation is volleyball. In volleyball, forearm passing or underhand passing is a fundamental skill used to receive the ball, control the opponent's attack, and direct the ball to a teammate as part of the initial formation of an attack. Mastery of this technique requires coordination of body position, leg stance, arm positioning, ball contact, and the ability to direct the ball accurately. Therefore, learning the underhand pass is not sufficient if students only perform the movement mechanically; students also need to understand the principles of movement, identify mistakes, receive feedback, and interact with peers during the training process. Research on volleyball learning at the secondary school level shows that Cooperative Learning can enhance academic learning time and support the acquisition of volleyball knowledge and skills, including the forearm pass skill (Akkaya & Mirzeoğlu, 2024). The findings indicate that the structure of learning and the quality of student interactions are important components in the development of sports skills. In volleyball-specific contexts, cooperative approaches have also been applied to improve underhand-passing learning through Team Assisted Individualization (Septiana et al., 2022) and Think Pair Share structures (Pamungkas et al., 2024). Evidence involving junior high school students further indicates that Cooperative Learning is relevant to volleyball-skill learning outcomes in an educational context closely related to the present study (Putra & Wibowo, 2022).

The problem that forms the basis of this research is the still low mastery of the basic underhand passing technique among eighth-grade students at SMP Negeri 2 Purwanegara. This condition indicates a gap between the demands of volleyball learning competencies and the actual abilities of the students. The issue of motor skills in physical education can become more complex when the learning process does not provide students with opportunities to observe each other, discuss, give feedback, and actively engage in correcting movement errors. Studies on student-centered models emphasize that learning which gives students greater responsibility can encourage independence, problem-solving, and engagement in the learning experience, although its implementation requires proper classroom management and learning design (Silva et al., 2021). Student perspectives also indicate that student-centered pedagogy can result in a more positive physical education learning experience when the learning is tailored to the context, material, and skill levels of the students (Silva et al., 2024).

One of the pedagogical solutions relevant to the problem is Cooperative Learning. This model organizes students into small groups so that the learning process occurs through positive interdependence, individual accountability, promotive interaction, the development of interpersonal skills, and group process evaluation. In physical education, cooperative learning allows students to learn not only from teacher instructions but also through peer observation, peer teaching, feedback, discussions, and completing movement tasks together. A systematic review shows that research on Cooperative Learning in physical education has yielded benefits, particularly in social learning, motivation, group climate, teacher-student interaction, and various aspects of motor skills (Bores-García et al., 2021). In motor learning, Cooperative Learning even demonstrates advantages over Direct Instruction in several skills because students have the opportunity to teach peers, provide

feedback, and take responsibility for the learning process within the group ((Mežan & Škof, 2023). Conceptually, Cooperative Learning places learners in structured group situations in which individual accountability is combined with responsibility for group success (Slavin et al., 2003). Different cooperative structures have been used in physical education, including Teams Games Tournament for passing material (Avisseña & Hidayat, 2020) and Think Pair Share for passing learning (Permana et al., 2026). Research on Cooperative-Learning-based physical education models also supports the relevance of structured cooperation for improving learning processes and outcomes in PE settings (Liu, 2022)

The benefits of cooperative learning also extend beyond skill aspects. Interaction among students can strengthen peer relationships and create a motivational climate more oriented toward task mastery (Železnik Mežan et al., 2025), while its application in physical education has been reported to support the development of students' emotional dimensions (Prieto et al., 2024). In the context of mastering practical skills, collaborative learning is positively related to student engagement, self-efficacy, and skill acquisition (Temirkhanov et al., 2024). The collaborative approach also provides students with the opportunity to develop critical thinking skills through discussion, interpretation, evaluation, and joint problem-solving in motion (Huang & Ning, 2021). In team sports, the process of knowledge construction through dialog and group reflection is even considered important for building tactical understanding and more contextual decision-making (Gaviria Alzate et al., 2025). Thus, these characteristics make Cooperative Learning relevant for learning underhand passing, which requires repetitive practice, technical corrections, and interaction among students.

Although empirical evidence regarding the benefits of Cooperative Learning is quite strong, there is still room for research that needs to be considered. A systematic review shows that many Cooperative Learning interventions in physical education are conducted over relatively short and fragmented durations, and have not always assessed the implementation process and learning outcomes multidimensionally (Bores-García et al., 2021). A broader review also identifies limitations related to the duration of implementation, the quality of peer teaching, the consistency of model implementation, and the simultaneous achievement of various learning domains (Fernandez-Rio & Iglesias, 2024). In the context of Indonesia, research on model-based practice is still relatively limited, and many studies focus on a single learning objective without adequately integrating social learning outcomes with other domains (Gustian et al., 2024). However, the experience of implementing hybrid models shows that cooperative environments can simultaneously support technical-tactical learning, social skills, motivation, and student engagement (Gil-Arias et al., 2023). Research on other sports skills also indicates that cooperative structures can enhance skill mastery while building a supportive learning environment (Khataybeh et al., 2024), while collaborative learning based on reflection and peer teaching can strengthen performance and attitudes toward physical activity (Li et al., 2026). The evidence indicates the need for research that examines the contextual implementation of Cooperative Learning through a continuous learning improvement process.

Based on this gap, this study aims to analyze the implementation of the Cooperative Learning Model in improving the mastery of forearm passing techniques among eighth-grade students at SMP Negeri 2 Purwanegara. The focus of the research includes changes in learning outcomes in the aspects of knowledge, attitudes, and skills through learning actions carried out cyclically and reflectively. The novelty of the research is not placed on the creation of a new

learning model, but rather on the application of Cooperative Learning as a pedagogical intervention based on classroom action that integrates the evaluation of cognitive, affective, and psychomotor domains in underhand volleyball passing learning and uses the results of each cycle as the basis for improving subsequent actions. With that scope, the research is expected to provide contextual evidence on how group work structure, peer interaction, practical exercises, and learning reflection can be integrated to improve the quality of volleyball skills learning at the secondary school level.

METHODS

Research Design

This study uses action research methodology, aimed at improving the process and outcomes of learning forearm passing in volleyball through the application of the Cooperative Learning Model. The action research design was chosen because the research problem stems from an actual teaching situation, namely the low mastery of basic forearm passing techniques among eighth-grade students at SMP Negeri 2 Purwanegara. Action research allows for systematic improvement through the implementation of actions, observation of changes, and reflection to determine enhancements for the next stage. The use of an action approach in the context of physical education is also relevant for developing reflective and contextual pedagogical practices; for example, (Bjørke et al., 2021) demonstrated the use of participatory action research in implementing Cooperative Learning to support changes in teaching practices in physical education. The research was conducted in two cycles, each consisting of four main stages: planning, action, observation, and reflection. Cycle II was carried out as a follow-up to the reflection results of Cycle I, so that weaknesses identified in the previous cycle could be addressed. This cyclical approach enables actions to be treated not as one-time interventions, but as a continuous process of learning improvement.

Participants and Research Location

The research was conducted at SMP Negeri 2 Purwanegara, Merden Weran, Purwanegara District, Banjarnegara Regency, Central Java. Teaching activities and data collection took place in the school's sports facilities. The research population consisted of all eighth-grade students actively participating in learning during the academic year, totaling 316 students across several classes. The research subjects were one class consisting of 32 eighth-grade students. The class was selected based on where the learning problem was identified, namely the low mastery of basic forearm passing techniques. The source documents did not provide detailed information about probability sampling techniques or demographic characteristics of the students; thus, these characteristics were not included in this study to avoid reporting unavailable data. The use of middle school students as the context for implementing Cooperative Learning is well supported by the literature. Bores-García et al., (2021) noted that most cooperative learning research in physical education is conducted at the secondary level, while Al Aridhee et al., (2023) specifically implemented the model with eighth-grade students in volleyball learning.

Research Procedure

In the planning stage, the researcher identified the learning problems related to forearm passing and designed learning activities based on Cooperative Learning principles. The lessons were designed not only for students to receive demonstrations or instructions but also to engage in group work, joint practice, observing peers' movements, discussions, and providing feedback. Students were placed in small, heterogeneous groups to promote cooperation and shared

responsibility in completing learning tasks. These characteristics are consistent with the principles of cooperative learning, which emphasize interaction, peer teaching, feedback, and learner responsibility in group learning (Mežan & Škof, 2023). The organization of these tasks was also consistent with methodological proposals for implementing Cooperative Learning in physical education through motor-action-based learning situations (Martin & Jiménez, 2021)

The action stage involved teaching the forearm passing technique. Students practiced mastering the movement stages, which included starting posture, making contact with the ball, arm and body position, ball rebound direction, and follow-through. Student interaction was used to provide greater opportunities to repeat skills, identify mistakes, and offer corrections to group members. This approach aligns directly with the findings of Akkaya and Mirzeoğlu (2024), who used Cooperative Learning in volleyball lessons and measured outcomes in both knowledge and skills domains, including the forearm pass.

In the observation stage, data were collected during and after learning activities to describe the development of students' attitudes, knowledge, and skills. In the reflection stage, the results from Cycle I were analyzed to determine learning achievement and to identify areas still needing improvement. The results of the reflection served as the basis for refining actions in Cycle II. Cycle II maintained the Cooperative Learning structure, with improvements based on issues identified in the previous cycle. This approach is important because the implementation quality of Cooperative Learning must be considered, not just the grouping of students (Bores-García et al., 2021).

Instruments and Data Collection Techniques

Data collection covered three learning outcome domains: attitude, knowledge, and skills. First, the attitude aspect was obtained through observation during the learning process. Observation scores were then converted and grouped into the categories of Very Good, Good, Fair, and Poor. Measuring the attitude domain is relevant because cooperative learning has a strong social and affective dimension. Prieto et al., (2024) showed that implementing Cooperative Learning in physical education can lead to changes in students' emotional abilities and interaction experiences.

Second, knowledge was measured using a test on forearm passing material in volleyball. Test scores were expressed on a 0–100 scale, with a minimum mastery criterion (KKM) of 75. Third, skill was measured using a performance assessment for forearm passing with a maximum score of 16, which was then converted into grades and ability categories. This combined measurement of knowledge and skills was also used in the cooperative volleyball learning study by Akkaya and Mirzeoğlu (2024), allowing for evaluation of learning outcomes beyond just motor performance.

Data Analysis

Data were analyzed using descriptive and inferential approaches with the help of SPSS. Descriptive analysis included mean scores, frequency, percentage by category, percentage of classical mastery, and percentage improvement in learning outcomes between Cycle I and Cycle II. Mastery of knowledge was determined by the proportion of students achieving a minimum score of 75, while skills were analyzed based on mean changes and ability category distribution. Individual improvement from Cycle I to Cycle II was also analyzed using N-Gain, which was then interpreted in categories of low, medium, and high improvement. Before inferential analysis, the normality of knowledge, attitude, and skill data was checked using the Shapiro–Wilk test at a significance level of 0.05. Data were considered to meet the normality assumption if $p > 0.05$.

To test changes in scores for the same subjects between Cycle I and Cycle II, a paired-samples t-test was used with a significance level of $\alpha = 0.05$. The null hypothesis was rejected if $p < 0.05$, indicating a significant difference in scores between cycles. This analysis was primarily used to measure knowledge and skills. Thus, the interpretation of action success was based on a combination of descriptive changes, learning mastery, N-Gain, and testing of inter-cycle score differences, enabling integrated evaluation of learning outcomes in the cognitive, affective, and psychomotor domains.

RESULTS

In this study, the results and discussion are presented to illustrate the effectiveness of the implementation of the cooperative learning model in improving the mastery of volleyball bottom passing in students of SMP Negeri 2 Purwanegara. The data obtained in the analysis is staged through two cycles of action which include aspects of knowledge, attitudes, and skills of students. The analysis was carried out to determine changes in student learning outcomes after the implementation of the cooperative learning model. The results of the study show that the STAD-type cooperative learning model can be used as an attraction by physical education teachers. This model is perfect for teaching bottom passing volleyball (Abdurahman et al., 2025).

In addition, the discussion in this study not only focuses on increasing learning outcomes quantitatively but also explains the process of changing student learning behavior during learning. The application of the cooperative learning model provides opportunities for students to work together, discuss, and help each other in understanding volleyball bottom passing techniques. Therefore, the results of the study are expected to provide an overview of the influence of the cooperative learning model on the improvement of student activities and overall defensive outcomes.

Normality tests are used to find out whether the data is distributed normally or not. The normality test was carried out using the help of SPSS with the Shapiro-Wilk test.

Table 1. Tests of Normality

Variable	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Knowledge_I	0,122	32	0.200*	0,971	32	0,515
Attitude_I	0,147	32	0,075	0,946	32	0,110
Skill_I	0,169	32	0,020	0,948	32	0,124
Knowledge_II	0,128	32	0.200*	0,963	32	0,337
Attitude_II	0,193	32	0,004	0,936	32	0,058
Skill_II	0,136	32	0,137	0,935	32	0,055

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the SPSS output, *Sig.* The value of knowledge in cycle I is . So it is accepted, meaning that the data on the value of knowledge in the first cycle is distributed normally. $0,515 > 0,05H_0$. *Sig.* The attitude value in cycle I is . So it is accepted, meaning that the attitude value data in the first cycle is distributed normally. $0,110 > 0,05H_0$. *Sig.* The skill value in cycle I is . So it is accepted, meaning that the skill value data in the first cycle is distributed normally. $0,124 > 0,05H_0$. *Sig.* The value of knowledge in cycle II is . So it is accepted, meaning that the knowledge value data in cycle II is distributed normally. $0,337 > 0,05H_0$. *Sig.* The attitude value in cycle II is . So it is

accepted, meaning that the attitude value data in cycle II is distributed normally. $0,058 > 0,05H_0$. Sig. The value of skills in cycle II is . So it is accepted, which means that the data on the value of skills in cycle II is distributed normally. $0,055 > 0,05H_0$

Analysis of Learning Outcomes of Knowledge Aspect

Table 2. Recapitulation of Knowledge Aspects outcomes In Cycle I And II

Completeness	Number of Students	Percentage
Cycle I		
Completed	10	31.25%.
Not yet finished	22	68.75%.
Total	32	100 %
Cycle II		
Completed	27	84.38%.
Not yet finished	5	15.63%.
Total	32	100 %

Based on the summary table of learning outcomes in the knowledge aspect of underhand passing in volleyball during Cycle I and Cycle II, there was an increase in student mastery. In Cycle I, out of a total of 32 students, 10 students were declared to have achieved mastery, with a percentage of 31.25%, while 22 students or 68.75% had not yet achieved mastery. These results indicate that, in Cycle I, most students had not yet reached the predetermined mastery criteria in the knowledge aspect of underhand passing in volleyball. After improvements were made to the learning process in Cycle II, students' learning outcomes showed a significant increase. Out of 32 students, 27 students achieved mastery, with a percentage of 84.38%, while the number of students who had not yet achieved mastery decreased to 5, or 15.63%. This shows that the learning actions implemented in Cycle II succeeded in improving students' understanding of the material and basic concepts of underhand passing in volleyball.

Overall, the number of students achieving mastery increased from 10 in Cycle I to 27 in Cycle II, or an increase of 17 students. In terms of percentage, mastery increased from 31.25% in Cycle I to 84.38% in Cycle II, representing an improvement of 53.13 percentage points. Meanwhile, the percentage of students who had not achieved mastery decreased from 68.75% to 15.63%, a reduction of 53.12 percentage points. To provide a clearer picture of the progress in students' learning outcomes regarding the knowledge aspect of underhand passing in volleyball, the increase in the percentage of student mastery from Cycle I to Cycle II can be seen in the following histogram.

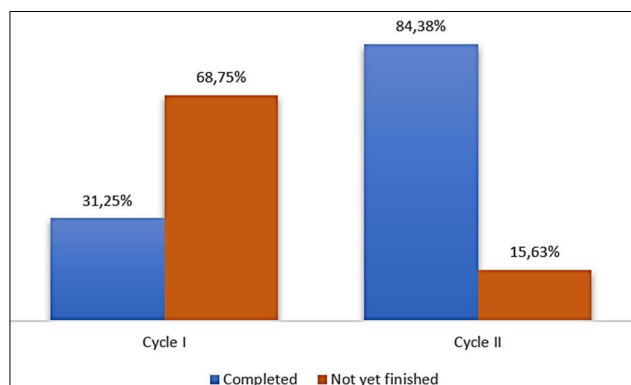


Figure 1. Percentage of Learning Improvement of Knowledge Aspects outcomes In Cycle I And II

Based on the figure, there was an improvement in learning outcomes in the knowledge aspect of underhand passing in volleyball from Cycle I to Cycle II. The mastery percentage increased from 31.25% in Cycle I to 84.38% in Cycle II. This indicates that the learning process in Cycle II produced better results compared to Cycle I.

To determine whether this increase is statistically significant, a Paired Sample t-Test was conducted on the learning outcomes from Cycle I and Cycle II. The results of this test are presented in the following table.

Table 3. Results Of The T-Test on Learning Outcomes in the Knowledge Aspect In Cycle I And Cycle II

		Paired Samples Test							
		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Knowledge I - Knowledge II	-15,000	1,270	,225	-15,458	-14,542	-66,813	31	,000

A value is obtained. It means rejected. The application of the cooperative learning model improves the learning outcomes of students' knowledge aspects between Cycle I and Cycle II. $\text{Sig. (2 - tailed)} = 0,00 < 0,05H_0$.

Table 4. N-Gain Calculation Results for Knowledge Test in Cycle I and Cycle II

Variabel	Mean Cycle I	Mean Cycle II	Ideal Score	N-Gain	Category
Knowledge Aspect	67,81	82,81	100	0,51	Medium

Analysis of Learning Outcomes of Skill Aspects

Based on the results of observations on the skill aspect, the assessment was carried out using a performance assessment instrument with a maximum score of 16. Because it does not use the KKM threshold, the analysis is focused on the frequency distribution of student ability categories and the increase in average scores between cycles

Table 5. Recapitulation of Learning Outcomes of Skill Aspects In Cycle II

Shoes	Category	Cycle I	Cycle II	Remarks
$90 \leq x \leq 100$	Excellent	0	11	Up, 11
$70 \leq x < 90$	Good	8	19	Up, 11
$50 \leq x < 70$	Enough	8	2	Down, 2
$25 \leq x < 50$	Less	16	0	Down, 16

In Cycle I, the average student skill score was 56.45. Based on Table 5, if classified, most students are still in the Good, Sufficient, and Less categories. After the action was taken in Cycle II, the average score increased to 86.52. This improvement in quality can be seen from the increase in the number of students in the Very Good category to 11 students, the good category from 8 to 19 students, and the decrease in students in the Adequate category to 2, as well as in the Less category there has been a decrease to no students in that category. Based on the improvement formula, a PP score of 53.29% was obtained, which indicates a positive development of psychomotor skills.

Based on Table 5, the results for underhand passing skills in volleyball show an improvement from Cycle I to Cycle II. The number of students in the "very good" category

increased from 0 to 11 students, and in the "good" category from 8 to 19 students. Conversely, the "fair" category decreased from 8 to 2 students, and the "poor" category from 16 to 0 students. This improvement in skill outcomes is visually presented in the following figure.

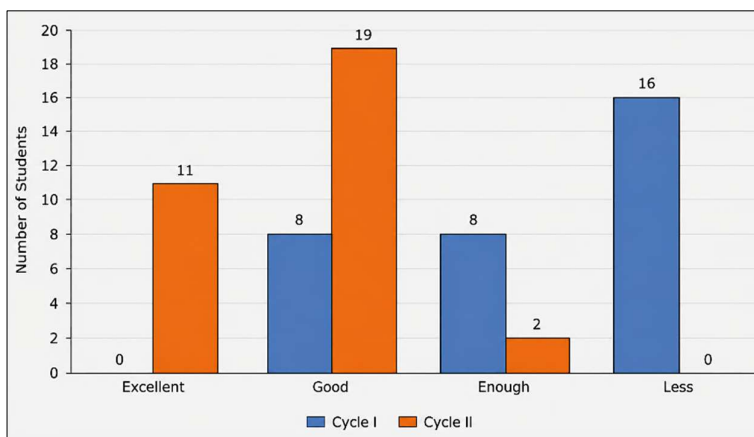


Figure 2. Percentage of Learning Improvement of Skill Aspects outcomes In Cycle I And II

Overall, the figure shows an improvement in underhand passing skills in volleyball from Cycle I to Cycle II. This is evident from the increased number of students in the "good" and "very good" categories, as well as the decreased number of students in the "fair" and "poor" categories. These findings indicate that the learning interventions implemented in Cycle II produced better results compared to Cycle I. To determine whether the improvement in skill outcomes is statistically significant, a Paired Sample t-Test was conducted on the results of Cycle I and Cycle II. The results of the test are presented in the following table.

Table 6. Results of the t-Test on Learning Outcomes in the Skill Aspect in Cycle I and Cycle II

		Paired Samples Test							Sig. (2-tailed)
		Paired Differences					T	df	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	<i>Skill I - Skill II</i>	-30,07812	11,27434	1,99304	-34,14296	-26,01329	-15,092	31	,000

A value is obtained. It means rejected. The application of the cooperative learning model improves the learning outcomes of students' skill aspects between Cycle I and Cycle II. $Sig. (2 - tailed) = 0,00 < 0,05H_0$.

Table 7. N-Gain Calculation Results for Skill Test in Cycle I and Cycle II

Variabel	Mean Cycle I	Mean Cycle II	Ideal Score	N-Gain	Category
Knowledge Aspect	56.45	86.52	16	0.71	High

Based on the calculation, an N-Gain value of 0.71 was obtained, which falls into the high category. This indicates that the cooperative learning model implemented has a high level of effectiveness in improving underhand passing skills in volleyball among students at SMP N 2 Purwanegara.

Activity Observation Analysis

Having it is an attitude score obtained by students, then the following are the categories of attitudes obtained by students. x

Table 8. Recapitulation of Activity Observation outcomes In Cycle I

Shoes	Category	Frequency	Percentage
$90 \leq x \leq 100$	Excellent	3	9,4%
$70 \leq x < 90$	Good	21	65,6%
$50 \leq x < 70$	Enough	8	25%
$25 \leq x < 50$	Less	0	0%
Quantity		32	100%

Based on the table, it is estimated that out of a total of 32 students, the majority are in the good category, which is 21 students or equivalent to 65.6%. Meanwhile, there were 3 students (9.4%) who managed to reach the Very Good category, and 8 students (25%) were in the Sufficient category, while none of the students were included in the Less category. Although most students have already demonstrated adequate achievement, the accumulation of this percentage becomes an important database for evaluating the effectiveness of actions in the first cycle and determining improvement steps to increase the number of students to a higher category in the next cycle. In cycle II, data were obtained in the following table.

Table 9. Recapitulation of Activity Observation outcomes In Cycle II

Shoes	Category	Frequency	Percentage
$90 \leq x \leq 100$	Excellent	9	28,1%
$70 \leq x < 90$	Good	18	56,3%
$50 \leq x < 70$	Enough	5	15,6%
$25 \leq x < 50$	Less	0	0%
Quantity		32	100%

The results of data analysis in Cycle II showed a significant improvement in the quality of student achievements, where as many as 9 students or around 28.1% had managed to reach the Very Good category. The largest group remained in the good category with a total of 18 students equivalent to 56.3%, while the number of students in the Fair category decreased to only 5 students or 15.6%. As in the previous cycle, no students (0%) were in the Less category. Overall, the dominance of students in the score range above 70 shows that the actions taken in Cycle II have succeeded in optimizing student learning outcomes compared to the achievements in the previous stage.

Based on the comparison of data results between Cycle I and Cycle II, it can be concluded that the application of the learning model has succeeded in significantly improving student attitudes. This increase can be seen from the shift in the frequency distribution of students to a higher category, where in Cycle I students who reached the Very Good category only numbered 3 people (9.4%), but in Cycle II it jumped drastically to 9 people (28.1%). In addition, there was a decrease in the number of students in the Sufficient category, from 8 people (25%) in Cycle I to only 5 people (15.6%) in Cycle II. This shows that the corrective actions given in each cycle are effective in helping students who were previously in the low category to move up to the Good or Very Good

category. Overall, these results prove that the classroom research actions implemented have achieved the expected goals with consistent improvement in learning quality.

The improvement in attitude observation results from Cycle I to Cycle II is subsequently presented visually in the following table and figure.

Table 10. Recapitulation of the Improvement in Observation Results of Activities in Cycle I and Cycle II

Shoes	Category	Frequency Siklus 1	Frequency Siklus 2	Remarks
$90 \leq x \leq 100$	Excellent	3	9	Up, 6
$70 \leq x < 90$	Good	21	18	Down, 3
$50 \leq x < 70$	Enough	8	5	Down, 3
$25 \leq x < 50$	Less	0	0	0

Based on Table 10, the distribution of students' attitude scores showed a positive shift from Cycle I to Cycle II. The number of students in the Excellent category increased from 3 students (9.4%) in Cycle I to 9 students (28.1%) in Cycle II, representing an increase of 6 students. Meanwhile, the number of students in the Good category decreased from 21 students (65.6%) to 18 students (56.3%), and the Enough category decreased from 8 students (25.0%) to 5 students (15.6%). No students were classified in the Less category in either cycle. Descriptively, these findings indicate a shift in the distribution of attitude scores toward a higher achievement category in Cycle II. Nevertheless, this frequency comparison should be interpreted as descriptive evidence of change; statistical significance should be determined separately using the paired-samples test.

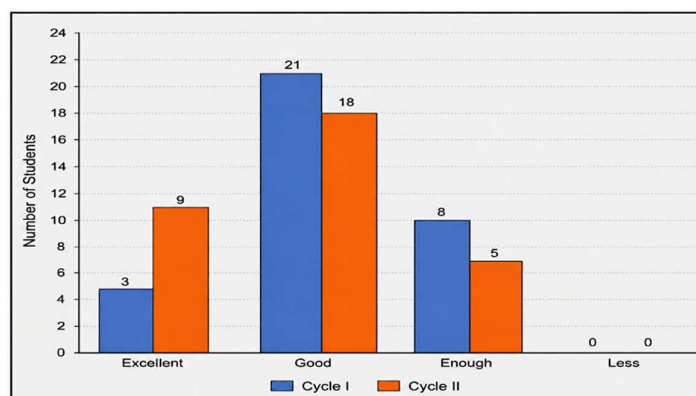


Figure 3. Percentage of Learning Improvement of Activity Observation outcomes In Cycle I and II

Overall, the figure shows an improvement in students' activity observation results in participating in the underhand passing volleyball lessons from Cycle I to Cycle II. This is evident from the increased number of students in the "excellent" category, because of the decreased number of students in the "good," "enough," and "less" categories. These findings indicate that the learning actions implemented in Cycle II produced better results compared to Cycle I. To determine whether the improvement in students' activity observation results is statistically significant, a Paired Sample t-Test was conducted on the results of Cycle I and Cycle II. The results of the test are presented in the following table.

Table 11. Results of the t-Test on Learning Outcomes in the Attitude Aspect in Cycle I and Cycle II

Paired Samples Test									
Paired Differences						T	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Attitude I - Attitude II	-5,66406	5,58101	,98659	-7,67623	-3,65190	-5,741	31	,000

A value is obtained. It means rejected. The application of the cooperative learning model improves the learning outcomes of students' skill aspects between Cycle I and Cycle II. $\text{Sig. (2-tailed)} = 0,00 < 0,05H_0$.

Table 12. Descriptive Statistics Results for Attitude Observation in Cycle I and Cycle II

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Attitude I	32	56,25	93,75	78,3203	9,91196
Attitude II	32	62,50	100,00	83,9844	10,52281
Valid N (listwise)	32				

Table 12 shows that the mean attitude score increased from 78.32 in Cycle I to 83.98 in Cycle II. The paired-samples t-test confirmed that this increase was statistically significant, $t(31) = -5.741$, $p < .001$, indicating a significant improvement in students' attitudes after the implementation of the Cooperative Learning Model

DISCUSSION

The research findings show that the implementation of the Cooperative Learning Model from Cycle I to Cycle II was accompanied by improvements in learning outcomes for forearm passing in both the knowledge and skills domains, as well as positive descriptive changes in the attitude aspect. This pattern can be explained by the characteristics of cooperative learning, which shift students from being passive recipients of instruction to active participants in the learning process. In forearm passing drills, students not only repeated movements but also observed their peers' performances, identified mistakes, discussed technique, provided feedback, and took responsibility for the success of their groups. This structure increases opportunities for motor learning while also encouraging cognitive elaboration of movement principles.

Rationally, skill development occurs because forearm passing is a skill requiring the integration of perception of the ball's trajectory, body positioning, limb coordination, ball contact, and directional control. Group interaction allows movement errors to be immediately observed and corrected through peer feedback. Mežan & Škof, (2023) explain that Cooperative Learning supports motor learning through peer teaching, feedback, active engagement, and learner responsibility. Li et al. (2026) also show that collaborative activities involving peer teaching and reflection can strengthen performance and increase engagement in learning. Thus, the improvements found in this study can be understood as the accumulation of practice, observation, reflection, and peer correction that took place during the action process. Evidence from other sport-skill contexts similarly shows that cooperative-learning strategies can be used in the acquisition of specific motor techniques, including the soccer throw-in (Al Aridhee et al., 2023). The importance of interaction is also

supported by research showing that verbal exchanges among students are related to skill development, game performance, and involvement during sport learning (Khalifa et al., 2021)

In terms of knowledge, group discussion provided students with the opportunity to construct an understanding of movement stages, the function of each technical component, and the errors that need to be addressed. Meanwhile, positive changes in attitude can be linked to students needing to cooperate, accept differences in ability, share responsibility, and help other group members. Prieto et al. (2024) showed that cooperative learning in physical education can support the development of emotional dimensions, while Železnik Mežan et al., (2025) found that cooperative learning contributes to peer relationships and a more mastery-oriented motivational climate. Beyond school physical education, team-based learning has been examined in relation to psychological and learning variables among sport-science students, suggesting that structured team learning remains relevant across levels of sport education (Albaladejo-Saura et al., 2025). The social contribution of Cooperative Learning is also reflected in research on gender-equality education in physical education (García-Taibo et al., 2024). From a sociocultural perspective, communication and cooperative learning are central to how young participants learn teamwork in sport settings (Arumí-Prat & Pla-Campas, 2025).

These research findings are strongly supported by studies directly addressing volleyball education. Akkaya and Mirzeoğlu (2024) demonstrate that the Cooperative Learning Model in secondary school students offers advantages in academic learning time, volleyball knowledge, and skill mastery, including the forearm pass. The similarity in educational level and skill content makes these findings highly relevant to this study. In other sports, Khataybeh et al. (2024) also found that cooperative learning strategies effectively improve mastery of gymnastics skills, while Mežan and Škof (2023) reported the superiority of cooperative learning compared to Direct Instruction in several motor skills among young athletes. Evidence from the Indonesian physical education context has likewise linked Cooperative Learning with students' learning activities and learning outcomes, strengthening the contextual relevance of this pedagogical approach (Puspita Sari et al., 2025)

More broadly, these findings are consistent with the systematic review by Bores-García et al. (2021), which showed that implementing Cooperative Learning in physical education benefits social learning, engagement, motivation, and learning outcomes. Fernandez-Rio and Iglesias (2024) also concluded that pedagogical models can support students' development in cognitive, social, physical, and affective domains. The position of Cooperative Learning as a model with a relatively strong evidence base is also affirmed by (Álvarez-Sánchez et al., 2026).

However, the literature shows that the effects of cooperative learning are not always uniform across all domains. Hu (2025) found that combining cooperative learning and virtual reality benefits motivation but does not produce significant between-group advantages in physical performance compared to traditional approaches. Likewise, Železnik Mežan et al. (2025) found improvements in peer relationships, emotional self-concept, and motivational climate, while differences in physical indicators were not significant. These contradictions indicate that the success of Cooperative Learning depends greatly on the type of outcomes measured, learning content, intervention duration, task quality, and fidelity of implementation. Fernandez-Rio and Iglesias (2024) even highlight that duration, practice time limitations, student-coach quality, and model fidelity can affect implementation effectiveness.

Theoretically, the research results can be explained through the socio-constructivist perspective, which sees knowledge and skills as developing through social interaction, dialogue, experience, and co-construction of meaning. Gaviria Alzate et al., (2025) emphasize that in team sports, knowledge is not merely transferred by the teacher, but is also constructed through communication, reflection, evaluation, and collaborative problem-solving. In the context of forearm passing, students build technical understanding through a combination of movement experience and information gained from interacting with peers.

This learning also reflects the principles of student-centered learning. Silva et al. (2021) explain that student-centered models can increase autonomy, creativity, decision-making, and problem-solving abilities. When students take roles as observers, feedback providers, skill performers, and group members, responsibility for learning no longer lies solely with the teacher. Farias & Mesquita (2022) emphasize that the quality of social interaction among learners is a foundation of a democratic, meaningful, and collaborative learning environment.

Development from one cycle to the next also aligns with the principles of action research, where learning is improved reflectively based on problems found in practice. Bjørke et al. (2021) showed that reflective processes in implementing Cooperative Learning can help reconstruct physical education practices. Therefore, the developmental findings of this research are best understood as the product of interaction between cooperative structures, practical experience, reflection, and gradual refinement of actions.

These research findings have several implications for physical education (PE) teachers. First, teaching forearm passing should not only involve demonstration and individual repetition but also integrate small groups that allow students to practice, observe, correct, and discuss. Second, groups should be deliberately structured to distribute abilities, enabling peer tutoring while maintaining individual responsibility. Third, teachers must provide clear movement criteria so that peer feedback is not merely general but focused on observable technical components.

The teacher's role remains crucial as task designer, facilitator, interaction quality observer, and provider of corrections when peer feedback is inadequate. Železnik Mežan and Cecić Erpić (2025) show that students at the start of implementation may not be able to cooperate effectively, so habituation to roles, group skills, and peer teaching is necessary. Thus, Cooperative Learning cannot be understood simply as "putting students into groups." Its implementation requires structured tasks, responsibility, positive interaction, and planned reflection.

In further practice, this model can also be combined with other pedagogical approaches according to learning objectives. Shen et al., (2025) and Carter-Thuillier et al., (2023) show that hybridizing Cooperative Learning with other pedagogical models can expand social and emotional benefits. Thus, the application of Cooperative Learning in volleyball teaching can be positioned as a flexible pedagogical strategy for developing technical skills while also building social, reflective, and student-centered learning experiences.

CONCLUSION

Based on the research findings, the implementation of the Cooperative Learning Model in teaching volleyball forearm passing to eighth-grade students at SMP Negeri 2 Purwanegara demonstrated improvements in learning outcomes across the knowledge, attitude, and skill domains. The step-by-step implementation of actions over two cycles provided students with opportunities to participate more actively in the learning process, collaborate in groups, observe one another,

provide feedback, and correct movement errors during practice. In the knowledge domain, the mean score and classical mastery increased substantially from Cycle I to Cycle II. In the skill domain, improvement was demonstrated by an increase in the mean score, a positive shift in ability categories, and the absence of students in the Poor category in Cycle II. The attitude domain also showed positive development, indicated by an increase in the mean score and a greater proportion of students reaching the Very Good category. Paired-samples t-tests confirmed statistically significant differences between Cycle I and Cycle II in the knowledge, attitude, and skill domains, while N-Gain analysis indicated moderate improvement in knowledge and high improvement in skills. Thus, the action hypothesis was accepted. The implementation of the Cooperative Learning Model was associated with meaningful improvements in students' mastery of volleyball forearm passing and supported positive development across cognitive, affective, and psychomotor learning domains. However, because the study employed a classroom action research design without a comparison group, the findings should be interpreted as evidence of improvement across successive learning cycles rather than as definitive causal evidence of superiority over other instructional models. Overall, Cooperative Learning may be considered an appropriate alternative for promoting more active, collaborative, and student-centered volleyball instruction.

RECOMMENDATION

Based on the research findings, the Cooperative Learning Model is recommended as an alternative approach for teaching volleyball forearm passing to junior high school students. Physical education teachers can optimize this model by forming small, heterogeneous groups, assigning clear roles, ensuring equal practice opportunities, and facilitating structured peer-to-peer feedback. The learning process should not focus solely on achieving movement skills, but also integrate aspects of knowledge, attitude, cooperation, responsibility, and students' reflective abilities. Teachers are also advised to provide clear technical guidelines regarding the indicators of successful forearm passing so that the peer feedback process can be more objective and focused. Learning evaluation should be conducted gradually by observing both the process and outcomes, enabling immediate improvements when students encounter difficulties. For schools, the implementation of cooperative learning should be supported by providing adequate training facilities, allocating proportional learning time, and improving teacher competence in applying student-centered learning models. For future research, it is suggested to use an experimental design with control groups, a larger sample size, and involve several schools so that the research results have broader generalizability. Further studies can also examine longer intervention durations, compare Cooperative Learning with other pedagogical models, and analyze additional variables such as motivation, learning engagement, quality of group interaction, skill retention, and consistency of forearm passing performance after the intervention is completed.

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