

THE EFFECTIVENESS OF TEAMWORK IN KASTI BALL SPORTS AMONG GRADE IV STUDENTS

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Abstract

Teamwork is a crucial 21st-century skill to develop in education. In education, teamwork is a crucial part of the collaborative and participatory learning process. The objective of this investigation is to ascertain the efficacy of incorporating the game of rounders in the enhancement of the cooperation abilities of elementary school students. The research method employed was a One-Group Pretest-Posttest Design, with 22 students selected through purposive sampling. Instruments utilised included observation diaries for students' collaborative behaviour during the learning process and a collaboration questionnaire. Reliability testing, normality testing, Paired Sample T-Tests, and normalised Gain (N-Gain) calculations were implemented to conduct data analysis. The results indicated a substantial improvement in the cooperation abilities of students following the implementation of an intervention that involved learning through rounders. The Paired Sample T-Test produced a significance value of 0.000 ($p < 0.05$), which suggests a substantial disparity between the pretest and posttest scores. An average increase of 56.29% was observed in the N-Gain analysis, which is regarded as moderate. Additionally, the pre- and post-intervention phases exhibited a substantial difference ($p = 0.042$), which supports the notion that the enhancement in cooperation is evident in both the assessment and the actual behaviour on the field. Consequently, the implementation of baseball can be regarded as effective in enhancing the cooperation abilities of students. These results suggest that baseball should be employed as a physical education learning strategy that prioritises the development of students' social values and character, in addition to their motor skills, in accordance with the requirements of a contemporary curriculum.

ABSTRAK

Kata Kunci:

Efektivitas, Kerja Sama Tim, Bola Kasti, Siswa SD, Pembelajaran Pendidikan Jasmani

Kerja sama tim merupakan keterampilan abad ke-21 yang sangat penting untuk dikembangkan dalam pendidikan. Dalam pendidikan, kerja sama tim merupakan bagian penting dari proses pembelajaran kolaboratif dan partisipatif. Penelitian ini bertujuan untuk mengetahui efektivitas penerapan permainan bola kasti dalam meningkatkan kemampuan kerja sama tim siswa sekolah dasar. Metode penelitian yang digunakan adalah One-Group Pretest-Posttest Design dengan subjek penelitian sebanyak 22 siswa yang dipilih secara purposive sampling. Instrumen yang digunakan meliputi kuesioner kerja sama tim dan

lembar observasi perilaku kolaboratif siswa selama proses pembelajaran berlangsung. Analisis data dilakukan melalui uji reliabilitas, uji normalitas, uji Paired Sample T-Test, dan perhitungan Normalized Gain (N-Gain). Hasil penelitian menunjukkan adanya peningkatan signifikan kemampuan kerja sama tim siswa setelah diberikan intervensi berupa pembelajaran melalui permainan bola kasti. Uji Paired Sample T-Test menghasilkan nilai signifikansi sebesar 0,000 ($p < 0,05$), yang menunjukkan perbedaan yang bermakna antara skor pretest dan posttest. Analisis N-Gain memperlihatkan rata-rata peningkatan sebesar 56,29% yang termasuk kategori sedang. Selain itu, hasil observasi menunjukkan perbedaan yang signifikan ($p = 0,042$) antara sebelum dan sesudah intervensi, yang memperkuat bahwa peningkatan kerja sama tim tercermin baik dalam penilaian maupun dalam perilaku nyata di lapangan. Dengan demikian, penerapan permainan bola kasti dapat dikatakan efektif dalam meningkatkan kemampuan kerja sama tim siswa. Temuan ini merekomendasikan agar permainan bola kasti dijadikan strategi pembelajaran pendidikan jasmani yang tidak hanya berfokus pada keterampilan motorik, tetapi juga membina nilai-nilai sosial dan karakter siswa sesuai tuntutan kurikulum modern

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1. Introduction

Physical education is a crucial component of the basic education curriculum, aiming to develop physically, mentally, and socially healthy students. Focusing not only on physical fitness, physical education also plays a crucial role in developing personality values such as honesty, responsibility, sportsmanship, discipline, and the ability to work together. Physical activities designed with a pedagogical approach can develop students' character holistically, both individually and socially (Siregar & Sembiring, 2022).

Amidst the challenges of an increasingly complex and competitive era, social skills such as teamwork are becoming increasingly necessary. Today's education system demands not only academic achievement but also social-emotional skills, including the ability to communicate, collaborate, and resolve conflict constructively. Therefore, it is crucial for schools to instill the value of cooperation from an early age, particularly in elementary school, which is the initial stage in the formation of a child's personality (Sudjatmoko et al., 2018).

Teamwork is a crucial 21st-century skill to develop in education. In education, teamwork is a crucial part of the collaborative and participatory learning process. Through collaboration, students learn to appreciate differences, integrate ideas, resolve conflicts, and achieve shared goals (Syahputra et al., 2017).

Strengthening the value of teamwork can be achieved through various approaches, one of which is through games in physical education. Sports naturally require social interaction, coordination, and cooperation among team members to achieve optimal

results. One form of game suitable for fostering these values is baseball (Mustafa & Dwiyoogo, 2020).

In the Merdeka Curriculum, baseball is included in the Physical Education, Sports, and Health (PJOK) learning materials for fourth-grade elementary school students. This material is designed to achieve basic competencies, including practicing basic movements in small ball games, including throwing, catching, and running techniques. It also demonstrates cooperation in physical activities through games, which include the roles of each team member and game strategies.

The goal of baseball instruction in fourth grade is to develop students' motor skills through practicing basic game techniques, improve teamwork and communication skills, and instill the values of sportsmanship and responsibility in play. The independent curriculum also encourages the use of an active and participatory learning approach. In baseball instruction, students are encouraged to participate in discussions about game strategies and engage in hands-on practice in small groups to improve their skills.

Baseball also serves as a medium for integrating the character values expected in the Pancasila Student Profile. These include: first, mutual cooperation, where students learn to support each other and work together as a team; second, sportsmanship, which involves respecting opponents and accepting the outcome of the game with grace (Tangkudung & Mylsidayu, 2017) ; and finally, independence, which involves taking initiative in the game and taking responsibility for one's role.

The advantages of baseball are its simplicity, fun, and ease of application in various learning situations (Heri & Andayani, 2021). This game can also be used as a medium to teach various social aspects such as leadership, responsibility, solidarity, and collective decision-making. Thus, baseball is not just a recreational game, but also an educational tool rich in character-building values (Purba et al., 2020). Rounders also trains concentration, quick thinking, decision-making, and effective communication skills among players. In the process, students learn how to adapt to situations, appreciate the contributions of teammates, and build trust to achieve shared goals. Therefore, rounders can be an effective tool for instilling and measuring the effectiveness of teamwork.

Based on initial observations conducted by researchers at SD Negeri 091513 Jawa Tonga, it was found that the teamwork skills of fourth-grade students in baseball were still not optimal (Syamsuddin et al., 2023). Some students still tend to play individually, are less able to communicate effectively with teammates, and do not understand their respective roles and responsibilities. As a result, the course of the game is often not well coordinated. This problem indicates that the learning implemented so far needs to be evaluated to improve the effectiveness of student teamwork, especially in baseball learning.

Table 1. Student Teamwork Score

Information	Criteria (KKM = 70)	Number of Students	Percentage
Completed	≥70	7	31.81 %
Not Completed	<70	15	68.19 %
Amount		22	100%

Teamwork is an important skill students need to develop in school. This skill not only helps students complete assignments together but also fosters social skills such as communication, mutual respect, and responsibility. However, based on initial observations of 22 students, only 7 (31.81 %) achieved a minimum teamwork score of 70, while 15 (68.19 %) still fell short of this criterion. This means that many students still struggle to collaborate with their peers.

These results indicate that although most students already possess fairly good collaborative skills, approximately one-third still require further guidance. Frequently encountered problems include a lack of effective communication, such as not listening to peers' opinions or being passive during discussions (Setyawan et al., 2021) . Furthermore, there are also issues with responsibility, such as failing to complete group assignments (Muhajir, 2023). If this problem is left unchecked, students who are less active in collaboration may feel excluded, and group-based learning will be ineffective. Therefore, it is important to find appropriate ways to help these students improve their collaboration skills. This can be done, for example, using learning methods that encourage students to communicate more, learn responsibility, and understand the importance of their respective roles in the group (Rohayati et al., 2019).

Based on the description above, the author is interested in conducting research with the title: "The Effectiveness of Teamwork in Baseball Sports for Fourth Grade Students of SD Negeri 091513 Jawa Tonga".

2. Methodology

The type of research used in this study is quantitative research with an experimental approach. Quantitative research with an experimental method is an approach that aims to test hypotheses through systematic observation and measurement. Quantitative research with an experimental method is well-suited for exploring and understanding the dynamics of teamwork in baseball and providing a strong foundation for developing interventions that can improve teamwork skills among students (Destiawan & Adi, 2021). This research design was designed using a quantitative experimental approach using a One-Group Pretest-Posttest design. This study aims to determine the effect of teamwork training on the effectiveness of teamwork in baseball. (Prasetyo, 2020) . This research design used a questionnaire to measure perceptions of teamwork before and after the intervention. Additionally, observations were conducted to assess students' teamwork behavior during the baseball game, using a prepared observation sheet. The research will be conducted at SD Negeri 091513 Jawa Tonga, Hatonduhan District, Simalungun Regency, North Sumatra Province. This research will be conducted in the even semester of the 2025/2026 academic year. The school is led by Mr. Flores Harahap, S. Pd.

The population is all targets used in research that generally have certain qualities and characteristics which are then studied and conclusions drawn by the author according to Sugiyono (Simanjuntak et al., 2024). The population in this study was all fourth-grade students of SD Negeri 091513 Jawa Tonga.

The sample is part of the population with characteristics determined by the researcher according to Sugiyono (Akhmad, 2011). The sample in the study was 22 fourth-grade students of SD Negeri 091513 Jawa Tonga. The method used to measure the effectiveness of teamwork in the game of baseball before treatment (initial ability test) to the target learning outcomes after being given treatment (post test). The target that must be achieved is of course the material mastered by students 100% and at least has reached the KKM to test the effectiveness of teamwork in baseball sports, manual calculations are used, namely the N-Gain effectiveness formula. The normalized Gain test is carried out to determine the increase in student teamwork in the game of baseball after being given treatment

3. Results and Discussion

Description of Research Results

This study was conducted with the aim of determining the effectiveness of the application of baseball games in improving student teamwork. The research design used was One-Group Pretest-Posttest Design, where the research subjects were given an initial measurement (pretest), then received intervention in the form of learning with baseball games, and after that were given a final measurement (posttest). The research subjects consisted of 22 fourth-grade students of SD Negeri 091513 Jawa Tonga who were selected using a purposive sampling technique according to the characteristics needed in this study (Nababan et al., 2018).

Pretest and Posttest Difference Test

To obtain an initial picture of students' teamwork abilities before being given treatment, an initial test (*pretest*) was conducted. Next, after learning through baseball games was given, students took a final test (*posttest*) (Nugraha, 2015) . The *pretest* and *posttest* data were then grouped into certain value ranges with the aim of seeing the distribution of student scores more clearly, as well as comparing the frequency in each category (Habibila & Nugroho, 2024). Presenting a comparison table of *pretest* and *posttest scores* is intended to show a shift in the distribution of scores that indicates an increase in students' teamwork abilities after receiving treatment. The comparison table of *pretest* and *posttest results* in this study is as follows:

However, after being taught through baseball, there was a shift in the distribution of scores on *the posttest* . There were no longer any students in the 11–20 range, and the number of students in the 21–30 range decreased to 7 (31.82%). Conversely, the number of students in the 31–40 range increased significantly to 15 (68.18%). This indicates a clear improvement in students' teamwork skills after the treatment. Thus, a comparison of *pretest* and *posttest scores* proves that the implementation of baseball has a positive impact on improving student teamwork. To clarify the results of the comparison of *pretest* and *posttest scores* , the data in Table 4.2 are presented in the form of a bar graph. This graph depicts the frequency distribution of students based on the range of scores obtained during *the pretest* and *posttest* as follows:

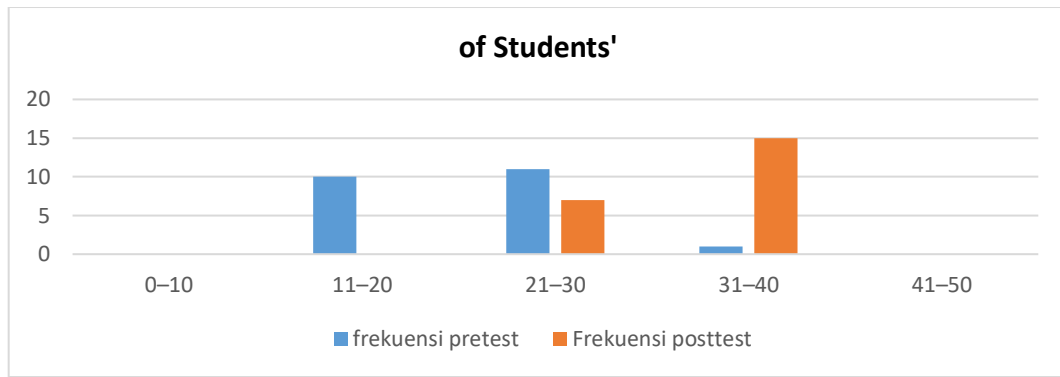


Figure 1. Comparison graph of pretest and posttest scores

The figure shows a comparison graph of students' *pretest* and *posttest scores* based on the range of scores obtained. The graph shows that during the *pretest*, the distribution of students' scores was still concentrated in the low range, namely 11–20 and 21–30. This indicates that most students had limited teamwork skills before being given treatment. After learning through baseball games was given, the graph shows a significant shift. The frequency of students in the 11–20 range decreased to zero, while the frequency in the 31–40 range increased sharply to become dominant. This trend confirms an increase in students' overall teamwork skills. Thus, the comparison graph strengthens the finding that the implementation of baseball games has a positive effect on increasing the effectiveness of teamwork in fourth grade students (Komarudin, 2015).

After conducting descriptive analysis through tables and graphs comparing *pretest* and *posttest scores*, the next stage is to conduct a hypothesis test to determine whether there is a significant difference between *the pretest* and *posttest scores*. The test used is *the Paired Sample T-Test*, because this study involved the same group with two measurements, namely before and after treatment (Nopiyanto & Raibowo, 2019). The *Paired Sample T-Test* aims to test whether the increase in scores seen from the descriptive results is truly statistically significant or just happens by chance. The results of this test will provide empirical evidence regarding the effectiveness of implementing the baseball game in improving students' teamwork skills.

The results of the *Paired Sample T-Test* in this study are as follows:

Table 2. Test Results

	Paired Differences		Std. Error	95% Confidence Interval Of The Difference		T	Sig. (2-df tailed)	
	Standard Mean	Deviation		Lower	Upper			
Pre Test Total Score - Post Test Total Score	-10,273	6,204	1,323	-13,024	-7,522	-7,766	21	.000

The results of the *Paired Sample T-Test*, as shown in Table 4.3, show that the average difference between the total *pretest* and *posttest scores* is -10.273, with a standard deviation of 6.204. The difference in scores is within the 95% confidence interval, which is

-13.024 to -7.522, all of which are less than zero. The t-statistic value used is 21 degrees of freedom (df), which is -7.766. The significance value (*Sig. 2-tailed*) is 0.000.

Given that this significance value is smaller than the established significance level ($\alpha = 0.05$), it can be concluded that there is a substantial difference in student cooperation scores before (*pretest*) and after (*posttest*) the rounders-based learning intervention. In other words, the implementation of rounders has been proven to have a substantial impact on improving student cooperation.

N Gain Analysis

To determine the extent of improvement after the intervention, not only the significance of the difference in *pretest* and *posttest scores is examined* , but also the magnitude of the improvement. The magnitude of improvement analysis is used to illustrate the relative effectiveness of the intervention in changing students' teamwork abilities. In this study, the improvement calculation was carried out using Normalized *Gain* (N- *Gain*). N- *Gain* provides information on the proportion of improvement achieved by students compared to the maximum possible score, thus classifying the effectiveness of the intervention into low, medium, or high categories.

Gain calculation is based on the difference between *the posttest and pretest scores* , which is then divided by the difference between the maximum score and each student's *pretest score*. *The results of the N- Gain calculation* for all respondents are presented in Table 4.5 below.

Table 3. Results of N Gain Analysis

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Standard Deviation
N <i>Gain</i> _percent	22	12.50	100.00	56.2852	28.09193
Valid N (listwise)	22				

Based on the table, the results of the N- *Gain analysis* show that of the 22 student respondents, the lowest (minimum) N- *Gain value* was 12.50%, while the highest (maximum) N- *Gain value* reached 100.00%. The average (mean) N- *Gain value* was 56.29% with a standard deviation (Std. Deviation) of 28.09%. Based on the effectiveness category criteria according to Hake (1998), the average N- *Gain* was included in the moderate category (30%–69%). This indicates that in general, the implementation of learning through baseball games was quite effective in improving student teamwork. The large variation in N- *Gain values* , as indicated by the range of values and the size of the standard deviation, indicates that the level of teamwork improvement was not uniform across all students. Some students experienced very high improvements, while others showed relatively low improvements, which could be caused by individual differences in initial abilities, motivation, and engagement during the learning process.

Discussion

The results of the study showed a significant increase in students' teamwork skills after being given an intervention in the form of learning through baseball. This is evident from the comparison of the distribution of *pretest* and *posttest scores*. During *the pretest*, most students were in the low category, namely 10 students (45.45%) were in the 11–20 range and 11 students (50%) were in the 21–30 range. Only 1 student (4.55%) reached the 31–40 range, while none of the students were able to reach a higher range. This condition illustrates that before the treatment, students' teamwork skills were still at a minimal level and were not evenly distributed (Nur et al., 2018).

After receiving treatment through baseball learning, there was a significant shift in the distribution of scores. There were no longer any students in the 11–20 range, and the number of students in the 21–30 range decreased to 7 (31.82%). Conversely, the number of students in the 31–40 range increased sharply to 15 (68.18%). This shift in distribution indicates that the majority of students experienced improved learning outcomes and were able to achieve a higher level of teamwork skills after the treatment. Thus, descriptively, the data demonstrates a positive change in students' teamwork skills (Supriyadi, 2021).

Statistical analysis using *the Paired Sample T-Test* strengthened these descriptive findings. This test yielded a significance value of 0.000 ($p < 0.05$), indicating that the difference between *pretest* and *posttest scores* was not due to chance alone, but rather a direct effect of the treatment. Practically, this confirms that playing baseball significantly contributes to strengthening collaborative interactions among students. Further analysis using *N-Gain* showed an average increase of 56.29%, which is considered moderate. This means that proportionally, learning through playing baseball is quite effective in improving teamwork skills, although there is still room for improvement and optimization, especially in accommodating differences in initial abilities, motivation, and group strategies used by students during play (Jusrianto et al., 2019).

Further analysis of the observation data further strengthened these quantitative conclusions. The significant difference in observation scores ($p = 0.042$) demonstrated that improvements were not only reflected in students' perceptions through questionnaires but also in their collaborative behavior in the field. Students appeared more active in providing support to team members, communicating strategies more openly, and organizing roles and responsibilities more orderly after the intervention. These findings underscore the importance of direct experiential context in social learning. Cooperative behavior cannot be developed solely through lectures or theoretical materials; it must be practiced through real-world situations that require coordination, communication, and interdependence among students.

Thus, it can be concluded that the implementation of baseball is not only effective in improving students' teamwork skills quantitatively but also encourages a real transformation in collaborative behavior on the field. These findings provide empirical evidence that traditional sports such as baseball have great potential as a physical education learning strategy oriented towards developing social skills and strengthening students' character, in line with the demands of a modern curriculum.

The connection between the findings of this study and current theories further strengthens the understanding that team games such as baseball can be an effective pedagogical tool. Effective teamwork is built on role clarity, mutual trust, supportive leadership, and open communication (Febrina and Jamilus, 2024). Baseball inherently demands all of these components: each student has a role to play, strategies must be mutually agreed upon, decisions must be communicated quickly, and team success depends on collective contributions (Munzir, 2025). Furthermore, game-based learning models not only improve motor skills but also develop tactical abilities, decision-making, and social interaction, as found in this study (Zainul, Ariya Hartati Yuli, and Christina, 2021).

The results of this study also align with recent research that specifically evaluated the effect of baseball on students' social development. Modified baseball significantly improved student coordination and communication in the context of elementary school physical education (Pulungan et al., 2025). Implementing baseball-based learning improved group coordination, strategy-building skills, and mutual support among students (Zainul, 2021). Baseball is effectively used as a character-building tool, particularly in collaboration and mutual cooperation. The consistency of these findings suggests that baseball is not merely a sporting activity but also a highly effective social education tool for strengthening students' interpersonal and character values (Lin, Huang, and Tsai, 2024).

The context of the Merdeka curriculum further clarifies the relevance of these findings. Physical education is now expected to not only improve physical fitness but also shape the Pancasila Student Profile by strengthening the values of mutual cooperation, independence, and integrity (Subandrio and Kartiko, 2021). Rounders provides an active learning platform aligned with this vision. This activity enables students to learn to manage their emotions when facing competitive pressure, fosters an appreciation for differences in ability, and hones collective decision-making skills in dynamic situations. This entire process makes learning not merely a transfer of knowledge, but a behavioral transformation that touches the cognitive, affective, and psychomotor domains in an integrative manner (Zainul, Ariya Hartati Yuli, and Christina, 2021).

The implementation of baseball learning has comprehensive efficacy in improving student cooperation, as evidenced by in-depth findings and consistency with current theory and research. This success demonstrates the importance of integrating traditional games into contemporary learning to offer contextual, enjoyable, and meaningful learning experiences that simultaneously meet the social, emotional, and character development needs of students in the 21st century.

4. Conclusion

Based on the results of the research that has been conducted, the conclusions obtained are as follows:

- a. Baseball has been shown to improve students' teamwork skills. The results of the *Paired Sample T-Test* showed a significant difference between *pretest* and *posttest scores* ($p = 0.000 < 0.05$). This indicates that the implementation of baseball has a significant positive impact on elementary school students' teamwork skills. This finding is further supported by the score distribution, where during *the pretest*, most students were in the

11–30 range, but after the treatment, the majority shifted to the 31–40 range. This shift confirms that baseball is effective in significantly improving teamwork skills.

- b. The effectiveness of the baseball game in improving students' teamwork skills was moderate. The *N-Gain analysis* showed an average increase of 56.29%, categorized as moderately effective. Furthermore, the observational results supported the quantitative findings, showing a significant increase in students' collaborative behavior on the field ($p = 0.042$). This indicates that baseball not only improved students' questionnaire scores but also reflected in concrete behaviors such as more open communication, better coordination, and more consistent team support.

Suggestion

Based on the research findings, it is recommended that physical education teachers utilize baseball as a learning strategy to hone motor skills and foster teamwork in students. Schools are expected to provide adequate support with facilities, infrastructure, and time. Further research can be conducted with broader contexts, varied game models, and larger samples to strengthen the validity of the results and enrich the impact of physical education learning in the future

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