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The Influence of Gobak Sodor and Bola Beracun (Poison Ball) Games on Students' Interest in Physical Education, Health and Sports Education at SMPN 3 Kalibening

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Abstract

This study was motivated by the low interest of students in Physical Education, Sports, and Health (PJOK) learning due to monotonous teaching methods. This study aims to analyze the effect of traditional games of gobak sodor and poison ball on increasing students' interest in learning PJOK. The research used a quantitative approach with a non-equivalent group pretest-posttest quasi-experimental design. The sample consisted of two eighth-grade classes at SMPN 3 Kalibening who were given treatment through both games. Data were collected using a four-point Likert scale questionnaire that had been tested for validity and reliability. Data analysis was performed using the Wilcoxon Signed-Rank Test because some of the data were not normally distributed. The results showed a significant increase in student interest ($Z = -5.352$; $p = 0.000$), with an average score increase from 82.35 to 89.72. The Mann-Whitney U Test results showed no significant difference between the effects of the two games ($p = 0.537$). The discussion relates the findings to Self-Determination Theory, in which traditional games fulfill the psychological needs of autonomy, competence, and social connectedness, thereby increasing intrinsic motivation and interest in learning. The conclusion of the study confirms that the implementation of traditional games is effective in increasing student interest in PJOK, with the note that inclusive adaptation to student characteristics is necessary to maximize its impact.

Keyword: Poison ball; interest in learning; gobak sodor; physical education, sports, and health (PJOK); traditional games; physical learning; junior high school

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Introduction

The education system in Indonesia has undergone continuous development in an effort to create a holistic and high-quality learning process, with a primary focus on strengthening student competencies. In line with the implementation of the independent curriculum and national education standards, the government continues to refine learning mechanisms to be more responsive to local and global needs, as well as contribute to improving the overall quality of education (Ningsih et al., 2024). In the context of implementing the independent curriculum, learning is no longer limited to mastering academic material, but also emphasizes the holistic development of students' physical, social, and emotional aspects.

Physical education, sports, and health (PJOK) subjects play a strategic role in shaping physical fitness and instilling the values of sportsmanship, cooperation, and responsibility. Therefore, innovative PJOK learning that is relevant to the social and cultural context of students is needed to support the achievement of national education goals (Suhartini et al., 2022). Physical education in schools does not only focus on movement activities, but also aims to teach concepts about movement and guide students to be able to move effectively and purposefully (Mahardika & Rustiadi 2017). Through Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, Article 1 paragraph (1) states that "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential.

Meanwhile, Article 3 emphasizes that national education serves to develop abilities and shape the character and civilization of a dignified nation in order to educate the nation"(Undang-Undang Republik Indonesia, 2003). One of the challenges in implementing physical education, sports, and health (PJOK) learning at the junior high school level is the low level of student interest in actively and consistently participating in learning activities. Based on an interview with PJOK teacher Mr. Widyasmara on June 5, 2025, it was found that the main causes of low interest were monotonous learning methods and psychological factors. To overcome this problem, more enjoyable learning methods are needed, one of which is through traditional games.

A similar problem was also found in a quantitative descriptive study published in the journal of sport science and coaching, which revealed that students' interest in learning PJOK theory at SMP Negeri 13 Kota Jambi was relatively low. Of the 133 eighth-grade students, only 31.57% showed interest in participating in lessons, while the other 68.43% were passive or did not participate much (Kurniawan et al., 2024). Based on the identified problems, this research is crucial to address students' low interest in learning and to offer alternative learning models that are more humanistic and contextual. Physical education in schools plays a strategic role in improving students' physical fitness. In addition to providing various forms of physical activity, physical education is also a means of instilling social values that apply in society (Pangestuti & Raharjo, 2017).

This further reinforces the importance of sports, including through PJOK, for the younger generation. In physical education, sports, and health (PJOK), interest in learning not only includes students' attention and interest in the subject, but also their willingness to take part in the physical activities taught. As stated by (Hasanah et al., 2022), Interest in learning physical

education can be understood as an internal drive that encourages students to actively and fully engage in sports activities in the school environment. This interest is formed through the interaction between internal factors, such as motivation and personal interest, and external factors, such as the learning environment and teaching strategies applied by teachers.

Interest is a strong tendency or drive accompanied by enthusiasm for an object or activity, which influences a person's focus of attention and encourages them to engage seriously and consistently (Kusuma & Setyawati, 2016). To explain the mechanism underlying increased interest in learning through traditional games, Self-Determination Theory (SDT) proposed by Deci and Ryan is considered relevant. This theory emphasizes that intrinsic motivation will arise when three basic psychological needs are met, namely autonomy, competence, and social connectedness (Loopers et al., 2024). In the context of PJOK, intrinsic motivation arises when students are given the freedom to choose movement strategies (autonomy), feel a sense of accomplishment in mastering motor movements (competence), and engage in interaction and teamwork (social connectedness/relatedness).

This intrinsic motivation then plays a role in encouraging a deeper increase in students' interest in learning. Traditional games allow students to engage and be motivated to learn because they allow them to choose roles and strategies (autonomy), collaborate and compete healthily with friends (relatedness), and master rules and tactics (competence) (Sim & Rahmat, 2025). Thus, the theoretical basis of this study combines the concept of learning interest as the main variable with intrinsic motivation based on Self-Determination Theory (SDT) as the basis for explaining the psychological mechanism. Within this framework, the games of *gobak sodor* and *bola beracun* serve as pedagogical stimuli designed to meet the psychological needs of students, thereby encouraging an increase in interest in physical education, health, and sports (PJOK) learning.

Student interest in physical education can be identified through a number of key indicators, including (1) level of attention to the material and physical activities presented, (2) feelings of enjoyment during the learning process, (3) interest in the types of sports activities taught, (4) active participation in each stage of learning, and (5) social support provided by teachers and peers. These five aspects play a significant role in shaping students' interest and encouraging their motivation to learn (Otundo & Garn, 2019). In the education system, student interest in learning is very important, affecting motivation, success, and retention. The development of this interest involves cognitive and emotional elements, as well as external support and favorable conditions created by educators (Jia, 2023).

Students' interest in learning contributes positively and significantly to their learning outcomes; the greater their interest, the higher the quality and achievement of their learning (Chasanah et al., 2023). The use of traditional and varied games is a relevant strategic approach to increase the effectiveness and interest of students in physical education, sports, and health (PJOK) learning. One such game is *gobak sodor*, an educational team game that emphasizes strategy, speed, and agility. In this game, one team tries to break through the opponent's defense without getting caught, while the other team is tasked with guarding the defense line.

This activity requires active physical involvement, body movement coordination, and social interaction between players, making it a dynamic and fun learning method (Kemaliah et al., 2017). In addition to *gobak sodor*, poison ball *(bola beracun)* is also a form of physical

activity that is highly competitive and recreational. Poison ball is a traditional ball game that involves competing characters where players throw balls into the arena and try to hit their opponents. Poison ball *(bola beracun)* can improve basic motor skills such as running and jumping as well as motor skills and reflexes. Furthermore, this activity helps you become more familiar with others and work together as a team.

Physical education learning becomes more lively and interesting in a competitive but fun atmosphere (Fajarwati & Sceisarriya, 2020). Previous studies have shown that *gobak sodor* games contribute significantly to improving the quality of physical education, sports, and health (PJOK) learning, particularly in terms of increasing interest, active participation, and the development of students' motor skills. Research conducted by (Nasta'in et al., 2021) Through a quasi-experimental method, it was revealed that the game of *gobak sodor* has a significant effect on increasing the interest in learning among elementary school students in the Lengkong District. These findings are supported by a t-test result of 27.838, which indicates a statistically significant increase.

Classroom action research conducted by (Hidayah, 2022), linking the game of *gobak sodor* with the career decision-making theory proposed by Krumboltz. Through a literature review approach, they highlight that this traditional game not only hones motor skills and teamwork, but also develops strategic thinking, risk assessment, and decision-making abilities. These abilities are considered relevant in supporting students' future career development. Research on the application of *gobak sodor* and *bola beracun* games has been conducted extensively at the junior high school level and shows the effectiveness of both games in supporting the physical education learning process, through a one-group pretest-posttest experimental design, found that the game of *gobak sodor* significantly contributed to improving students' physical abilities, particularly in terms of speed, agility, strength, and gross motor coordination in students at SMP Negeri 1 Nagrak (Batseran & Junaidi, 2022).

Research by (Syafriadi et al., 2021) The results of classroom action research conducted at SDN 4 Selaparang, East Lombok, show that the application of traditional games in PJOK learning can significantly increase student interest. Initially, only two students showed active involvement, but that number increased to nine students in the second cycle, reflecting a 70% increase in participation. These findings indicate that the integration of traditional games can be an effective strategy in fostering student interest in learning in the context of physical education. Learning interest is an affective element that plays an important role in the educational process because it is closely related to student involvement, attention, and intrinsic motivation to engage in learning activities.

When students have interest, they tend to be more focused, earnest, and emotionally involved in completing tasks, so that the learning experience becomes more profound and meaningful. However, in the field of physical education and sports, research that specifically discusses learning interest and the psychological mechanisms that influence intrinsic motivation is still relatively scarce. Most studies are still focused on physical or cognitive aspects, so empirical research that can systematically measure learning interest and relate it to the use of traditional games in learning is still very much needed (Harackiewicz et al., 2016). Based on the problems in PJOK learning and previous findings, this study aims to analyze the

effect of *gobak sodor* and poison ball games on students' interest in participating in PJOK learning and to determine.

The focus of the research includes a comparison of pre-tests and post-tests in both games in terms of stimulating student interest. Theoretically, this study is expected to enrich traditional game-based learning models and serve as a reference for further studies. Practically, the results can be used by physical education teachers as a contextual strategy to increase learning participation, as well as a reference for schools in developing local wisdom-based curricula.

Method

This study applies a quantitative approach, which is a method that relies on the collection and analysis of data in numerical form, in order to systematically examine a phenomenon in research (Siroj et al., 2024). This study applied a quasi-experimental method with a non-equivalent group pretest–posttest design without a control group. The study was conducted on two treatment groups (Denny et al., 2023). The research procedure began with a pretest on the first day, followed by the implementation of learning based on traditional games of *gobak sodor* and poison ball during the research period with two interventions, each learning session lasting 1 hour and 20 minutes. and ending with a posttest to measure changes in the research subjects on the last day.

The purpose of these two interventions was to reduce the possibility of temporal errors, because psychological variables such as interest can be influenced by many other factors over time if measurements are taken gradually over a long period of time. For example, student motivation can be influenced by their environment, classroom conditions, or personal events outside of the intervention. The hypothesis in this study states that there is a significant effect of the application of traditional game-based learning models on increasing student interest in learning. The research population refers to all subjects or objects that are the target of the study, which have certain characteristics or attributes that allow the research results to be generalized to all members of the population.

The population in this study was all students at SMP N 3 Kalibening, consisting of grades VII, VIII, and IX, with a total of nine classes. Sampel dalam penelitian ini terdiri atas dua kelas yang masing-masing difungsikan sebagai kelompok perlakuan, kelas VIII B yang berjumlah 27 siswa dan kelas VIII C yang berjumlah 27 siswa. This study applied the simple random sampling technique, which is a sampling method in which each individual in the population has an equal chance of being selected randomly and independently. The use of this technique aims to reduce potential bias and obtain data that is representative of the research population (Noor et al., 2022).

Since there is more than one class, the random selection technique can be done by drawing lots. This is done by putting the names of the 9 classes into a lottery bottle and then drawing 2 for sampling, after which the 2 classes will be given treatment. The type of instrument used in this study was a PJOK learning interest instrument compiled using a four-level Likert scale. This instrument contains positive and negative statements designed to measure students' level of interest in participating in PJOK learning. The indicators used

include: (1) attention to learning materials, (2) feelings of enjoyment when participating in lessons, (3) active involvement in the learning process, and (4) interest in continuing to participate in PJOK learning.

This instrument was adapted from a questionnaire developed by (Wahyudi, 2021), which has been proven to be valid and reliable in the context of physical education learning at the secondary school level. Before being used for data collection, the research instruments were tested for validity and reliability. Validity was tested using Pearson's item-total correlation. The results of the analysis showed that all statements were valid because they had a correlation coefficient greater than the r-table value ($r > 0.381$) with a significance level of $p < 0.05$. In addition, the reliability of the instrument was tested using Cronbach's Alpha coefficient, which produced an alpha value of 0.921, indicating that the instrument has a very good level of internal consistency and is suitable for use in research.

The data in this study were analyzed using descriptive and inferential statistical approaches. Before the main data analysis, a normality test was first conducted using the Shapiro-Wilk test to determine the appropriate analysis technique. If the results showed that the data were normally distributed, the t-test was used as a parametric analysis tool, whereas if the data were not normally distributed, the Wilcoxon Signed Rank Test was used as a nonparametric approach.

Result

Descriptive analysis was used to provide an overview of student interest scores before (pre-test) and after (post-test) the treatment was given. The descriptive statistics presented include the number of respondents (N), minimum score, maximum score, mean, and standard deviation (SD). The results of these calculations are shown in the following table.

Tabel 1. Descripitive Statistics

	Skor Pre Test	Skor Post Test	Valid N (listwise)
N	54	54	54
Minimum	54	72	
Maximum	96	96	
Mean	82.35	89.72	
Std. Deviation	9.254	5.041	

Based on table 1, it can be seen that the students' interest scores in the pretest stage had an average of 82.35 with a standard deviation of 9.254. The lowest score obtained by students was 54, while the highest score reached 96. In the posttest stage, the average interest score of students increased to 89.72 with a standard deviation of 5.041, with a minimum score of 72 and a maximum of 96. These findings indicate that descriptively, there was an increase in students' interest scores after the treatment was given. Before conducting the hypothesis test, a data normality test was first conducted to determine whether the distribution of student interest scores on the pretest and posttest met the assumption of normal distribution. The normality test used the Shapiro-Wilk method, because the sample size in each group was less than 50 students. The results of the normality test are presented in the following table.

Tabel 2. Tests of normality

Types of Games	Stages	Statistic	df	Sig.
Gobak Sodor	Pretest	0.932	27	0.076
Bola Beracun	Pretest	0.922	27	0.043
Gobak Sodor	Posttest	0.843	27	0.001
Bola Beracun	Posttest	0.935	27	0.092

Based on table 2, it is known that the data on student interest scores in the *gobak sodor* game group during the pre-test had a significance value of 0.076 ($p > 0.05$), so it was normally distributed. Meanwhile, student interest scores in the *bola beracun* game group during the pretest had a significance value of 0.043 ($p < 0.05$), so it was not normally distributed. Furthermore, the interest scores of students in the *gobak sodor* game group during the posttest had a significance value of 0.001 ($p < 0.05$), which means that they were not normally distributed, while the *bola beracun* group during the posttest had a significance value of 0.092 ($p > 0.05$), which means that they were normally distributed.

After determining that the data was not completely normally distributed, hypothesis testing was continued using the non-parametric Wilcoxon Signed-Rank Test. This test was used to identify differences in student interest scores between the pretest and posttest stages. The results of the Wilcoxon test analysis are presented in the following table.

Tabel 3. Wilcoxon signed ranks test

Description	Stages	Statistic	Sum of Rank
Negative Ranks	7	9.50	66.56
Positive Ranks	41	27.60	1109.50
Ties	6		
Total	54		

Based on table 3, it was found that 7 students experienced a decrease in interest scores in the posttest stage, 41 students showed an increase in scores in the posttest stage, and 6 students had the same scores in both measurements. The mean rank and sum of ranks in the positive group were higher (Mean Rank = 27.06; Sum of Ranks = 1109.50) than in the negative group (Mean Rank = 9.50; Sum of Ranks = 66.50). These findings indicate that, in general, there was an increase in student interest scores after the treatment was given.

Tabel 4. Wilcoxon signed ranks test (test statistics)

Statistik uji	Nilai
Z	-5.352
Asymp. Sig. (2-tailed)	0.000

Based on table 4, a Z value of -5.352 was obtained with a significance level of 0.000 ($p < 0.05$). These results indicate a significant difference between students' interest scores on the pretest and posttest. Thus, it can be concluded that the treatment given had a significant effect on increasing student interest. The results showed a statistically significant difference (Z = –

5.352; $p < 0.001$). The effect size can be calculated using the formula $r = Z/\sqrt{N}$, and the value is $r = 0.73$, indicating that the effect of the intervention was very large.

Tabel 5. Mann-whitney test

Test Statistics[a]

	Test scores
Mann-Whitney U	329.000
Wilcoxon W	707.000
Z	-.617
Asymp. Sig. (2-tailed)	.537

a. Grouping Variable: Research Group

The results of the analysis using the Mann-Whitney U test showed that there was no statistically significant difference between the group that played *gobak sodor* and the group that played poison ball ($U = 329.00$; $p = 0.537$). Calculation of the effect size using the formula $r = Z/\sqrt{N}$ yielded a value of $r = 0.084$, indicating that the effect of the intervention was very small.

Discussion

The results of this study indicate that the application of traditional games *gobak sodor* and *bola beracun* has a significant effect on increasing students' interest in learning PJOK. This is evidenced by the Wilcoxon test results, which produced a significance value of 0.000 ($p < 0.05$). These findings indicate that traditional game-based learning activities can create an active and enjoyable learning atmosphere and increase student participation. These results are in line with previous research (Mujriah et al., 2022) who reported that the application of traditional sports models can strengthen students' basic motor skills and social attitudes through collaborative and contextual activities.

Similar findings were also reported by (Filandari et al., 2021) which explains that integrating traditional games into learning can increase student motivation, concentration, and engagement in the learning process. Thus, a traditional game-based approach can be seen as an effective learning strategy to foster student interest and participation in physical education. In addition, the results of the analysis using the Mann-Whitney U test showed that there was no significant difference between the group that played *gobak sodor* and the group that played *bola beracun*. These findings indicate that both games had a relatively comparable effect on the variables studied.

This is also reflected in the very small effect size ($r = 0.084$), which indicates that the intervention did not have a significant practical impact. Therefore, the differences in scores between the groups were more fluctuating in nature and did not represent a real difference in the effects of each treatment. This condition is thought to be related to the similarity of the physical activity characteristics and the level of participant involvement in both types of games, so that the responses generated tend to be equivalent. It is interesting to note that although the traditional games of *gobak sodor* and *bola beracun* generally significantly increased students'

interest in learning, the results of the study also showed differences in individual responses to learning.

This condition confirms that the success of a method is not solely determined by the model used, but also by the characteristics and psychological needs of the students. A total of seven students experienced a decline in their post-test scores, indicating that the increase in interest in learning did not occur evenly. Within the framework of Self-Determination Theory (SDT), the increase in students' interest in learning through the application of *gobak sodor* and *bola beracun* games can be understood as the result of the fulfillment of students' basic psychological needs, including autonomy, competence, and social connectedness. Both games allow students to be actively involved and have the space to determine their actions during the game, thus supporting the fulfillment of the aspect of autonomy.

In addition, students' success in performing various physical activities provides them with an experience of mastery that reinforces their sense of competence. The interaction and cooperation between students during the game also plays a role in fulfilling the need for social connectedness. The fulfillment of these three psychological needs further encourages the development of intrinsic motivation, which contributes to an increase in students' interest in learning PJOK (Cheon et al., 2018). However, variations in individual responses indicate that not all students feel that their psychological needs are being met equally, so learning strategies need to be adjusted to optimize the benefits of traditional games.

Factors such as personality differences, activity preferences, and social comfort are thought to influence these variations. Students who dislike competitive activities or intense group interactions tend to have unmet needs for autonomy, social connectedness, and competence, resulting in low engagement and responsiveness to learning (Yang & Kuo, 2022). From the above discussion, teachers need to modify games to make them more inclusive by adjusting the rules, difficulty levels, and role variations to accommodate students' different abilities and preferences. A supportive teaching approach, such as positive feedback and reinforcement of cooperation, is important to increase student engagement. In addition, a brief reflection after the game is necessary to help students make sense of their learning experiences and strengthen their intrinsic motivation.

Conclusion

This study presents empirical evidence that the application of traditional games *gobak sodor* and *bola beracun* in physical education lessons is associated with a significant increase in student interest in learning. This is reflected in the results of the significant Wilcoxon Signed-Rank Test ($Z = -5.352$; $p < 0.05$) and an increase in the average learning interest score from 82.35 to 89.72. These findings confirm that traditional games are not merely recreational activities, but have substantial pedagogical value in strengthening students' affective engagement in the context of physical education. Although the Mann-Whitney U test did not show a significant difference between the two types of games, the more stable improvement pattern in the gobak sodor game indicates that the effectiveness of game-based learning is not only determined by the existence of the game activity itself, but also by the quality of the game design.

Game structures that encourage relatively equal participation, meaningful social interaction, and continuity of student engagement appear to play an important role in optimizing the impact of learning. Theoretically, the results of this study reinforce the relevance of Self-Determination Theory in the context of physical education by showing that traditional game-based learning can create conditions that support the fulfillment of students' basic psychological needs, namely autonomy, competence, and social connectedness. The fulfillment of these needs contributes to the development of intrinsic motivation and increased interest in learning.

However, the variation in individual responses, as indicated by a decline in scores among some students, suggests that the process of fulfilling psychological needs is contextual and influenced by the characteristics of the students and the quality of the intervention implementation. From a practical perspective, these findings highlight that the success of integrating traditional games into physical education learning is highly dependent on teachers' ability to design and adapt games in a flexible and inclusive manner. Without adjustments to students' differences in abilities, preferences, and psychological needs, the effectiveness of the intervention has the potential to be uneven.

Therefore, strengthening teachers' pedagogical competencies in game-based learning design is an important prerequisite. For future research, it is recommended to use a more rigorous methodological design, including the use of control groups, testing of mediating variables such as intrinsic motivation and perceived competence, and a longitudinal approach to evaluate the sustainability of the impact of traditional games. These strategies are expected to increase the validity of inferences and strengthen the empirical contribution of research in the international discourse on game-based learning and physical education.

Author's Statement

This research is an original scientific work that was entirely compiled by the author through an independent process of analysis and data collection. This manuscript has never been published or submitted for review in any journal or other scientific publication, either in print or online. All stages of the research and writing of this article have followed the principles of research ethics and upheld the values of academic integrity, ensuring that it is free from plagiarism and intellectual property rights violations.

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