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Discovery Learning with Traditional Educational Game *Gobak Sodor* in Physical Education Learning

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ABSTRACT

Physical education aims to improve both physical fitness and social skills. Discovery Learning in physical education, rooted in a constructivist approach, fosters active exploration, problem-solving, and understanding through direct experiences. Incorporating traditional educational games like *Gobak Sodor* serves as an effective model for achieving these dual objectives. A mixed-methods approach was employed, utilizing Embedded Design to combine qualitative and quantitative data for a comprehensive analysis. The study involved 32 seventh-grade students from SMPN 3 Majalengka. Qualitative data were gathered through interviews and observations, while quantitative data were collected using physical fitness tests (endurance, strength, agility) and questionnaires. Social skills were evaluated based on communication, cooperation, empathy, and conflict resolution. The implementation of Discovery Learning with the *Gobak Sodor* game significantly enhanced students' physical fitness and social skills. Improvements were observed in endurance, strength, and agility, alongside better communication, cooperation, and empathy among students. The findings highlight the effectiveness of traditional educational games in achieving physical and social development in physical education settings. However, further research is recommended to explore the application of this method in diverse student populations to confirm its broader applicability. Discovery Learning with the *Gobak Sodor* game positively impacts students' physical fitness and social skills. Expanding this approach to other contexts could provide valuable insights for educational innovation.

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1. INTRODUCTION

Physical education plays a vital role in the holistic development of junior high school students, especially during the critical phase of early adolescence. This stage is marked by significant physical and mental changes, requiring support through effective education to foster healthy growth (Aartun et al., 2022; Cronin et al., 2020; Demchenko et al., 2021; García-Rico et al., 2021; Lee & Lee, 2021). At this level, physical education not only emphasizes physical fitness and promotes knowledge of a healthy

lifestyle but also equips students with essential motor skills, such as coordination, balance, and physical strength. Beyond physical improvements, physical education fosters critical social skills by encouraging collaboration, teamwork, and interpersonal communication through group activities (Bjørke & Mordal Moen, 2020; Block et al., 2021; O'Connor & Penney, 2021; Opstoel et al., 2020). Thus, physical education contributes significantly to the development of students' physical well-being, mental health, and social competencies.

One of the important aspects in learning physical education to students is to give students freedom with directed guidance to find their own patterns in learning. One of the learnings that facilitates it is learning by using the discovery model. Learning using the discovery learning model offers a different approach to learning where students actively construct their own understanding through the learning activities they participate in (Hidayat & Sujarwo, 2022; Kurniawati, Oktradiksa, & Shalikhah, 2021; Rumsariadi, Sari, Hufri, & Dewi, 2023; Subramaniam & Sapri, 2022; Walo, Ilyas, & Rahmawati, 2021). The main key of discovery learning is where students must find the right concept or strategy to be able to solve the problem at hand. In addition to learning that involves a lot of active students in the process, it also needs to be a concern to be able to choose traditional educational games (Budiman & Rusdiyanto, 2021; Budiman, Yudha, & Anshori, 2021). The related to honing agility, such as the traditional game "*Gobak Sodor*". This activity not only develops physical skills, but also involves students' cognitive abilities, such as problem solving, quick decision making, and adaptation to changing game situations. Thus, Discovery Learning allows students to learn more deeply, integrating physical and mental aspects in interactive physical education learning.

Gobak Sodor is a traditional game originating from Indonesia and is popular especially in the Javanese community (Ansharudin et al., 2022; Jariono et al., 2023; Parengkuan, 2024). *Gobak Sodor* is a traditional game that trains physical endurance, fitness and teamwork (Ansharudin et al., 2022; Fitri, Nur, & Putri, 2020; Heritage, 2024; Parengkuan, 2024). In simple language Gobak means to move freely or run around while Sodor means spear or defense line. This traditional game provides learning related to cooperation, physical fitness and agility how to win the opponent by breaking through the opponent's defense line. This game is very simple by capitalizing on the boundary separators on the ground can use ropes or the like. The game can already be played. *Gobak Sodor* is closely related to physical education because the game requires cooperation and agility and excellent fitness so that the player can pass through the opponent's defense line. In addition, the sudden movements made by students in this game help train reflexes and body coordination, which are very important in the development of gross motor skills. Seeing such a game that *Gobak Sodor* can be an alternative in physical education learning to train student fitness.

Learning with the Discovery learning model and the *Gobak Sodor* educational game can be implemented by first dividing students into several groups. After that, the teacher provides the rules and how to play related to *Gobak Sodor* starting from the defense line to the rules of this game. After students understand the rules of the game in the *Gobak Sodor* game, students are given the freedom to be able to determine the right strategy in order to win the game (Eldrian, Gusmira, Ma'arif, Lestari, & Amellia, 2024; Irawan et al., 2023). Some movements such as diverting opponents and movements that can provoke the release of the opponent's defense line can be explored by students themselves so that students are able to design effective tactics in playing this game. Students will think of the right strategy that can be taken for various reasons so that in practice this game can hone students' critical thinking and problem solving skills in physical education learning.

Discovery learning can be integrated with traditional educational games such as *Gobak Sodor* to create an active and meaningful learning experience. In this context, students are invited to explore the rules of the game, understand strategies, and find the best way to win the game through direct experience. This process is in line with the constructivist approach, where students actively construct their own knowledge through social interaction, collaboration, and reflection. In addition, *Gobak Sodor* also teaches values such as teamwork, decision-making, and dexterity, all of which can enrich the

discovery learning process in physical education. By using this traditional game, students not only learn cognitively, but also develop physical and social skills in a fun and interactive atmosphere.

While previous studies (Ansharudin et al., 2022; Parengkuan, 2024) highlight the positive impacts of discovery learning and the *Gobak Sodor* game on students' physical fitness and social skills, gaps remain in understanding how these methods can be systematically integrated into physical education curricula. Existing research has primarily focused on the outcomes without detailing the process of implementation or addressing challenges such as ensuring equitable participation and engagement among students. This research aims to bridge these gaps by exploring the structured integration of the discovery learning model with Gobak Sodor to create an active, collaborative, and contextual learning environment.

The study investigates how this approach can enhance both physical fitness—through improved endurance, strength, and agility—and social skills, including communication, cooperation, and empathy. The novelty of this research lies in its focus on combining an evidence-based pedagogical approach with a culturally rooted traditional game, offering a unique strategy to modernize physical education. The findings are significant for educators, providing actionable insights into designing inclusive and engaging physical education programs that align with developmental needs and foster holistic growth. This study underscores the potential of *Gobak Sodor*, traditionally a recreational game, as an innovative educational tool that not only entertains but also empowers students to thrive physically and socially.

2. METHODS

This research approach uses mixed methods. This is based on being able to provide a comprehensive picture through qualitative and quantitative data collected. The technique used is Embedded Design, where qualitative and quantitative components complement each other. Quantitative research was used to measure the impact of the application of the Discovery Learning method with *Gobak Sodor* game on students' physical fitness and social skills, while qualitative research was used to explore the experiences of students and teachers during the implementation of learning.

The research subjects were students of SMPN 3 Majalengka class VIIA, which consisted of 32 students. These respondents have limitations that certainly need to be developed on a much larger number of respondents so that they can provide a comprehensive picture. Then divided into four large groups consisting of 8 people each. Each team will compete in the *Gobak Sodor* game, and the winning team will meet in the finals to become the best team. The instrument consists of a questionnaire to measure students' physical fitness before and after the application of the *Gobak Sodor* game. These measurements may include endurance, strength, and agility tests. For social skills, assessments are made ranging from communication, cooperation, empathy, and the ability to resolve conflicts. The research instrument was taken from a modification of a standard instrument that is commonly used in these measurements.

Physical fitness was measured using endurance tests, namely running, muscle strength tests, flexibility tests, and agility tests. While social skills are measured using a questionnaire that has been prepared by the research team. As for qualitative data using interview guidelines for students related to students' views on the use of *Gobak Sodor* in learning. Quantitative data analysis used descriptive and inferential statistics to determine the effectiveness of the application of Discovery learning with *Gobak Sodor* game. While qualitative data is done by triangulating data.

3. FINDINGS AND DISCUSSION

Physical Education has a role in developing students' physical, mental and social skills (Block et al., 2021; Cassidy, 1965; Farooq & Parker, 2009; Nur, Suherman, Subarjah, & Budiana, 2019; O'Connor

& Penney, 2021). In this context, innovative learning is needed so that learning objectives can be achieved properly. One aspect that can be used in physical education learning is the discovery learning model. This model shows the importance of student activity in learning in order to construct the understanding and strategies used. Traditional games, such as *Gobak Sodor*, not only provide entertainment, but also offer opportunities to develop social and physical skills. This study aims to explore the impact of implementing Discovery Learning method through *Gobak Sodor* game on students' physical fitness and social skills.

In this section, an explanation will be given about the effect of the discovery learning model with traditional educational echoes of *Gobak Sodor* in improving physical fitness and social skills in students. In addition, students' responses to the use of discovery learning with the traditional educational echo of *Gobak Sodor* will also be analyzed. The results of the analysis are as follows:

3.1 The Effectiveness of discovery learning with traditional educational echoes of Gobak Sodor on physical fitness

To evaluate the effectiveness of discovery learning integrated with the traditional educational approach of Gobak Sodor on physical fitness, researchers conducted assessments both before and after the learning activities. The physical fitness evaluation included endurance, muscle strength, flexibility, and agility tests. These assessments were administered to all 32 students, with the results summarized as follows:

Table 1 Students' Fitness Score Before and After

	Pretest					Posttest				
Subject	durability	muscle strength	electability	Agility	Average	durability	muscle strength	electability	Agility	Average
S-1	65	70	55	75	66.25	80	85	85	90	85
S-2	60	55	50	75	60	85	85	85	85	85
S-3	70	65	65	70	67.5	75	80	90	85	82.5
S-4	75	60	65	70	67.5	90	80	90	80	85
S-5	70	65	60	55	62.5	85	85	85	85	85
S-6	65	65	55	65	62.5	80	85	85	80	82.5
S-7	65	60	55	65	61.25	85	80	85	85	83.75
S-8	65	55	60	50	57.5	85	75	80	85	81.25
S-9	55	55	60	50	55	85	75	95	80	83.75
S-10	50	50	65	55	55	70	85	90	85	82.5
S-11	50	50	60	50	52.5	75	75	90	85	81.25
S-12	55	50	55	65	56.25	70	85	85	90	82.5
S-13	60	55	65	65	61.25	75	75	80	95	81.25
S-14	65	50	60	50	56.25	80	85	85	85	83.75
S-15	70	50	55	55	57.5	85	75	80	85	81.25
S-16	70	55	65	55	61.25	75	70	85	85	78.75
S-17	65	60	60	50	58.75	85	75	80	80	80
S-18	60	60	65	65	62.5	80	85	85	85	83.75
S-19	65	60	60	65	62.5	85	80	80	85	82.5
S-20	60	65	75	50	62.5	75	75	90	80	80
S-21	75	65	75	55	67.5	90	80	85	85	85
S-22	65	65	60	70	65	85	75	80	80	80
S-23	60	70	65	65	65	80	85	85	85	83.75
S-24	70	70	60	60	65	75	75	80	85	78.75

S-25	75	65	65	75	70	80	85	80	80	81.25
S-26	75	65	60	65	66.25	85	80	85	80	82.5
S-27	60	65	75	60	65	85	85	85	85	85
S-28	65	60	65	60	62.5	80	75	85	85	81.25
S-29	60	60	65	65	62.5	85	85	80	80	82.5
S-30	65	60	60	65	62.5	80	85	85	85	83.75
S-31	60	70	65	60	63.75	85	85	90	85	86.25
S-32	60	70	60	65	63.75	85	85	85	80	83.75
Average	64.06	60.63	62.03	61.41	62.03	81.25	80.47	84.84	84.06	82.66
Maximum Score	75	70	75	75	70	90	85	95	95	86.25
Minimum Score	50	50	50	50	52.5	70	70	80	80	78.75

The results provide an overview of the scores before and after discovery learning with the traditional educational echo of *Gobak Sodor*. The average pretest score of students in the endurance category was 64.06, while the average posttest score increased to 81.25. This shows an increase of 17.19 points, which reflects the better development of students' physical endurance after the learning. In the aspect of muscle strength, the students' average pretest score was 60.63, and after the intervention, this score increased to 80.47, with an increase of 19.84 points.

Students' flexibility also experienced a significant increase. The pretest score for flexibility was 62.03, while the posttest score showed an average result of 84.84, which signifies an increase of 22.81 points. This indicates that the physical activities performed during the *Gobak Sodor* game contributed positively to the improvement of students' flexibility ability.

In addition, student agility, which initially had an average pretest score of 61.41, also showed a significant increase, with the posttest score reaching 84.06, which means an increase of 22.65 points. Looking further, the maximum scores obtained by students in all aspects of fitness show that there are students who are able to achieve the highest scores. The maximum score for endurance reached 75, muscle strength 70, flexibility 75, and agility 75. Conversely, the minimum score achieved shows that there are students with the lowest score of 50 in all aspects, indicating that there is still room for improvement. These results illustrate that learning with discovery learning and traditional educational echoes of Gobak Sodor have a positive influence on students' physical fitness. To analyze further, a normality test was conducted for the pretest and posttest, the results are as follows:

Table 2. Normality Test Results

	Shapiro-Wilk	**Conclusion**
	Sig.	
Pretest	.285	Normal Distribution Data
Posttest	.124	Normal Distribution Data

The normality test results for students' pretest and posttest data were measured using the Shapiro-Wilk test. Table 2 shows the significance values (Sig.) obtained for both measurements. Pretest: The significance value obtained was 0.285. Based on the normality test criteria, if the Sig. value is greater than 0.05, then the data distribution can be considered normal. With a value of 0.285, it can be concluded that the students' pretest data is normally distributed.

Posttest: For the posttest measurement, the significance value obtained was 0.124. Just like in the pretest measurement, this value is also greater than 0.05, so we can conclude that the students' posttest data is also normally distributed. Thus, both the pretest and posttest data show normal distribution, which is an important requirement for continuing the next statistical analysis. This gives us confidence

that the analyses performed on these data, such as mean comparisons, can be done with appropriate parametric methods. The parametric test used was the Paired sample T Test. The results are as follows:

Table 3. Hypothesis Testing 1

	Significant	Results
Pretest - Postest	0.000	discovery learning with traditional educational game *Gobak Sodor* effectively improves physical fitness

Table 3 presents the results of the hypothesis test conducted to assess the effectiveness of discovery learning using the traditional educational game *Gobak Sodor* on improving students' physical fitness. This hypothesis test uses the significance value to determine whether there is a significant difference between students' pretest and posttest scores. The hypothesis test results show a significance value of 0.000. In the context of hypothesis testing, this significance value is much smaller than the commonly used significance level of 0.05. This indicates that there is a significant difference between students' pretest and posttest scores after the application of discovery learning method through *Gobak Sodor* game. The next step is to measure the effectiveness of discovery learning through *Gobak Sodor* game on social skills.

3.2 The Effectiveness of discovery learning with traditional educational echoes of Gobak Sodor on Social Skills

To evaluate the effectiveness of discovery learning integrated with the traditional educational game Gobak Sodor in enhancing social skills, researchers conducted assessments using a social skills questionnaire administered both before and after the intervention. The questionnaire assessed key dimensions of social skills, including communication, cooperation, empathy, and conflict resolution. The findings from this evaluation are as follows:

Table 4. Descriptive Statistics of Students' Social Skills

	Minimum	Maximum	Mean	Std. Deviation
Pre_Social Skills	60.00	75.00	65.0000	5.38816
Post_Social Skills	75.00	90.00	82.8125	3.34507

Table 4 presents descriptive statistical data regarding students' social skills before and after the application of the discovery learning method through the traditional game *Gobak Sodor*. This data provides an overview of the distribution of students' social skills scores, as measured using the minimum, maximum, mean, and standard deviation. From this data, it can be seen that students' social skills scores before the implementation of the learning method ranged from 60.00 to 75.00, with an average score of 65.00. The standard deviation of 5.39 indicates that there was relatively little variation in students' social skills scores before the intervention, meaning that most students had scores close to the average. After the application of the discovery learning method, students' social skills scores experienced a significant increase. The minimum post-intervention score was 75.00 and the maximum reached 90.00, with an average score of 82.81. The lower standard deviation of 3.35 indicates that after the intervention, students' social skills scores were more uniformly distributed, meaning that most students showed a more even improvement in social skills. Then the normality test results are as follows:

Table 5. The Results of the Normality Test

	Shapiro-Wilk	Results
	Sig.	
Pre_Social Skill	.000	Non-Normal Data Distribution
Post_Social Skill	.000	Non-Normal Data Distribution

The significance value for pre-social skills is 0.000, which indicates that this value is much smaller than the commonly used significance level (0.05). Thus, we can conclude that the pre-social skills data is not normally distributed. For the post-social skills data, the significance value is also the same, which is 0.000. This indicates that the post-social skills data is also not normally distributed. Although there was an increase in the average students' social skills after the intervention, the distribution of students' scores after the application of the discovery learning method through the *Gobak Sodor* game still did not follow the normal distribution. A non-parametric test, the Wilcoxon test, was conducted for testing. The results are as follows:

Table 6. Hypothesis Testing 2

	Significance Value of Wilcoxon Test	Results
Pretest – Posttest Social Skill	0.000	discovery learning with traditional educational game *Gobak Sodor* effectively improves social skills

The Wilcoxon test results show a significance value of 0.000. In the context of hypothesis testing, if the significance value is smaller than the commonly used significance level (0.05), then we can reject the null hypothesis, stating that there is no difference between the pretest and posttest scores. With a significance value of 0.000, it can be concluded that there is a significant difference between students' social skills before and after the application of the discovery learning method with *Gobak Sodor* game. These findings provide empirical support for the use of traditional games in education, as a means to improve not only physical skills, but also students' social skills. The limitation of this study is that it does not look at the percentage extent to which learning factors with traditional educational games contribute to physical fitness and social skills.

3.3 Results of Interviews with Students

Interviews were used to get a comprehensive picture of the responses to the application of the discovery learning method with the *Gobak Sodor* game. The interview results will strengthen the quantitative data results that have been described in the previous section.

Table 7. Summary of Interview Results on Students

No.	Questions	Respondent	Responses
1	What do you think about using the discovery learning model with *Gobak Sodor* game in learning?	Student	Through the discovery learning model with the *Gobak Sodor* game, students feel happy because in addition to entertainment, there is also a race to be the best team.
2	How do you feel your social skills have changed after using the discovery learning model with *Gobak Sodor* game?	Student	Through this kind of learning, I feel motivated to be able to work together in a team so that I can contribute to the team winning the match.

3	Do you feel that the discovery learning model with *Gobak Sodor* game helped improve your physical fitness?	Student	Because I don't stand still, I run to empty places so that I am more physically trained in this learning.
4	What do you like about this learning method?	Student	It teaches cooperation, has fun and games, and challenges you to find the best strategy.
5	Are there any challenges you face when learning with this method?	Student	Overall, there is nothing but sometimes there is miscommunication between friends where they should run, but they respond differently.
6	What do you think about the interaction between students during play?	Student	We have to communicate well, if communication is not good teamwork cannot go well either.
7	Do you have any suggestions for improvement in the use of this game?	Student	My suggestion is to add other types of traditional games
8	How much influence do you think the game has on learning motivation?	Student	I am motivated because there is a winner in every match so I want to be the best I can be.

Based on the results of the interviews, it can be seen that the 4 students interviewed who are representatives of the 4 existing teams gave a positive response related to the use of the discovery learning model with the *Gobak Sodor* game. This supports the quantitative research results described in the previous section where the discovery learning model with *Gobak Sodor* game is effective in improving students' physical fitness and social skills.

The results of this study indicate that the discovery learning model with *Gobak Sodor* game is effective in improving physical fitness and social skills of junior high school students (Ansharudin et al., 2022; Aulia, Suryansah, & Januarto, 2022; Parengkuan, 2024). Physical fitness is important to train to students so that students have good physical endurance. The traditional game of *Gobak Sodor* facilitates physical fitness because the game relies on agility and good physicality to be able to win the match. Another interesting thing is that besides physical fitness, there is also an increase in students' social skills, which is in line with the learning objectives of physical education, namely physical fitness and mental and social students in the learning process. The application of the traditional game *Gobak Sodor* which is rich in social values such as cooperation and communication has a positive impact on students in physical education learning.

The inclusion of games in competitive settings, such as Gobak Sodor, motivates students to strive to become the best team, requiring effective teamwork and strategic planning. This engagement fosters a sense of motivation, which is a critical component of the psychological development essential for students (Bullard, 2016; Erhel & Jamet, 2013; Harandi, 2015; Hodeck & Hovemann, 2016; Islam et al., 2018; Kim & Kim, 2013; Law, Geng, & Li, 2019; Malone & Lepper, 1983; McIntosh, 2005; Wang et al., 2015; Ward et al., 2008). Motivation serves as an intrinsic and extrinsic driving force that encourages students to achieve their goals, overcome challenges, and excel in both academic and extracurricular activities.

In the context of physical education, motivation is particularly important as it not only enhances performance in games but also cultivates a positive attitude toward physical activities, improving overall engagement and persistence. For instance, the collaborative nature of Gobak Sodor encourages students to develop and execute team tactics effectively, reinforcing the importance of cooperation and

shared goals. Additionally, this type of activity promotes self-regulation, resilience, and a competitive spirit in students, which are vital for their holistic growth. By embedding motivational elements within the game, educators can help students internalize the values of teamwork, strategy, and perseverance, enabling them to translate these lessons into other areas of their lives.

Specifically, the improvement in students' physical fitness can be seen from the pretest and posttest results which showed significant improvements in fitness components such as endurance, muscle strength, flexibility, and agility. This shows that the discovery learning model with *Gobak Sodor* game involving physical activity can train physical fitness with movement and agility in the *Gobak Sodor* game. In addition, the discovery model also teaches to find the right strategy to be used in the game.

The results of this study are in line with research (Ansharudin et al., 2022; Aulia et al., 2022; Parengkuan, 2024) which shows that traditional games can improve students' physical fitness. This learning gives students the freedom to determine tactics and strategies that are considered appropriate to be the best team. Thus, this study confirms the importance of integrating traditional games in physical education learning. The discovery learning model applied through *Gobak Sodor* not only improves students' physical fitness but also enriches their social skills, which in turn can contribute to the formation of students' better character and personality. By playing *Gobak Sodor*, students not only get physical activities that help improve physical fitness, such as strength, agility, and endurance, but also learn social skills, such as cooperation, communication, and problem-solving in groups. This experience trains students to appreciate team roles, think strategically, and understand social rules and norms. Ultimately, this combination of physical fitness and social skills can contribute to the formation of strong characters, such as discipline, responsibility, honesty, and hard work, which are important parts of building a better student personality.

4. CONCLUSION

Based on the results of qualitative and quantitative data analysis, it can be concluded that the use of Discovery Learning with Traditional Educational Games "*Gobak Sodor*" in Physical Education Learning can improve students' physical fitness and skills. There needs to be variations in the use of traditional educational games outside of *Gobak Sodor* so that students can recognize more traditional games that are related to physical education learning. Education policy makers need to develop programs that introduce variations of other traditional games so that students not only improve their physical fitness and social skills, but also preserve local culture. This policy can be accompanied by training for teachers to integrate traditional games into innovative learning, thus creating a fun, meaningful learning environment that holistically supports the formation of students' character. For further research, other traditional educational games can be developed outside of *Gobak Sodor* so that the results of this research can be enriched.

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