



## The Effect of Game Warm-Ups in Increasing Students' Interest in Learning in Physical Education, Sports and Health

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### ABSTRACT

This study aims to determine the influence of game heating on students' interest in learning physical education, sports, and health at SMP Negeri 1 Bojongmangu school. The main problems are the low interest of students in heating which can be caused by teaching methods, lack of variety in heating, and limited facilities. The method used is an experiment with a quantitative approach. With a total of 37 students as the object of research with one group pretest posttest. This research was conducted at SMPN 1 Bojongmangu by taking one class as a research sample, namely class VIII.3 which amounted to 37 out of 148 students of class VIII. There are three stages, namely: Pre-test, Treatment, and Post-test, research providing treatment is carried out in class to find out students' learning interest in learning physical education, sports and health before providing treatment. After the pre-test was carried out, the researcher gave the treatment, namely by using a game warm-up. After being given treatment, the researcher then conducted a post-test in the classroom to find out the effect of game warming up in increasing students' interest in learning physical education, sports and health at SMPN 1 Bojongmangu school. The research was processed using the paired sample t test formula with the mean result However, the results of the paired sample t test showed an average difference value of 9.135 with a value of  $t = 8.435$  with a significance of  $0.000 < 0.05$ , thus it can be said that there is a significant difference between the pretest and posttest results

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A. Conception and design of the study;  
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## INTRODUCTION

Physical education physical activities taught include athletics, swimming, gymnastics, sports games such as volleyball, basketball, table tennis, badminton, football, floor gymnastics, rhythmic gymnastics, etc. Therefore, the purpose of physical education itself can develop motor skills, improve health and fitness and encourage a healthy lifestyle. Sports and Health physical education aims to keep students fit and can help them create new movements obtained from learning Kusuma physical education (S.



T. Pelajaran et al., 2024). Physical activity is also a process of improving fitness in students and maintaining a healthy lifestyle. Physical education can also develop students' abilities through physical activity so that they can be healthy, know knowledge, skills and good attitudes (S. T. Pelajaran et al., 2024).

Physical education is physical activity to improve body fitness, movement skills, emotional intelligence, and a healthy lifestyle. Physical education also focuses on three aspects, namely cognitive, affective, and psychomotor. In addition, physical education can also pay attention to mental health, social skills, and norm values.

Based on the results of observations at SMPN 1 Bojongmangu school, there is one of the prominent problems, namely the lack of interest in carrying out the warm-up in the learning of physical education, sports and health, during the warm-up activity many students warmed up inseriouly and seemed to feel bored. This phenomenon can be caused by several factors, first, the very monotonous teaching method, the monotonous way of delivering material can cause students to feel bored with the warm-up, and second, the lack of variety in the warm-up activities carried out in the same way can cause boredom in students so that it causes a lack of interest in students in participating in the warm-up, Third, inadequate facilities such as limited sports equipment can also reduce students' interest in participating in warm-ups.

The researcher chose the title of the influence of game-based warming in increasing students' learning interest in learning physical education, sports, and health because it will apply game-form warming to students, the goal is to reduce saturation and increase students' interest in learning physical education, sports and health. As for if students warm up inseriouly or not optimally, there will be injuries to muscles and joints, increased risk of dehydration, decreased immune response, and increased pain after warming up.

there is a significant gap in the literature that ignores the problem of students' lack of interest in warming up at SMPN 1 Bojongmangu, where monotonous teaching methods, lack of variety, and limited facilities lead to boredom, thereby increasing the risk of muscle injury, dehydration, and decreased immune response. This gap is increasingly important to address as there are few studies exploring the effects of play-based warm-up as an innovative strategy to increase student motivation, while the urgency of this research is increasingly urgent given the long-term impact on students' physical and mental health, especially in the era of widespread sedentary lifestyles, where failure to form an interest in learning early can hinder the achievement of overall physical education goals, Therefore, this study aims to fill this gap by applying game-based warm-up interventions in grade VIII students to increase active participation and increase students' interest in learning in physical education, sports and health.

## **METHODS**

The research method is a series of planned steps to collect, analyze data in order to answer questions, or test hypotheses. This method is very important because it

answers the framework in a structured way, so that research can be carried out objectively and can be accounted for. This research uses a quantitative approach, quantitative research is research that focuses on collecting data analysis, testing hypotheses, measuring variables, and drawing conclusions statistically. The research method used is the pre-experimental research method. This method can provide an understanding of the interaction between the variables studied (Waruwu et al., 2025).

This type of research is pre-experimental design, with the form of research using one group pretest-posttest design. With implementation in 3 stages, namely pretest, treatment, posttest. Sampling techniques can be categorized into 2, namely probability sampling and non-probability sampling. In probability sampling, it can be categorized into several sampling, namely simple random, systematic, and stratified random. Meanwhile, non-probability includes quota, accidental, purposive sampling, and snowball sampling (Subhaktiyasa, 2024). The research was carried out at SMP Negeri 1 Bojongsangu School. With a population used by all grade VII students.

The sample used was purposive sampling class VIII.3 which amounted to 37 students. The design used is one group pre test – post test is carried out on one group of experimental classes, in this design the researcher will conduct an initial measurement (pre-test) of the experimental class group before carrying out treatment. After being given treatment, the researcher conducts a final measurement (post-test) to assess the effect of the treatment that has been applied. The instrument used in this study is in the form of a statement item questionnaire totaling 25 items that have previously been tested and proven to be valid.

If the research variables are not identified correctly, then they can cause errors in the withdrawal process (Hafizah et al., 2025). The free variable is the warm-up of the game and the bound variable is the student's learning interest in learning physical education, sports and health. Data collection technique with skla likert skla. The data analysis carried out was a descriptive test, validity test, reliability test, normality test, homogeneity test and paired sample t test, how to calculate it using SPSS windows 25.

## **RESULTS AND DISCUSSION**

### **Result**

This study aimed to examine the effect of game-based warm-up activities on increasing students' interest in learning Physical Education, Sports, and Health (PJOK) at SMP Negeri 1 Bojongsangu. Data were collected from 37 students using a pretest-posttest design. The results include descriptive statistics, normality testing, homogeneity testing, and paired sample t-test analysis.

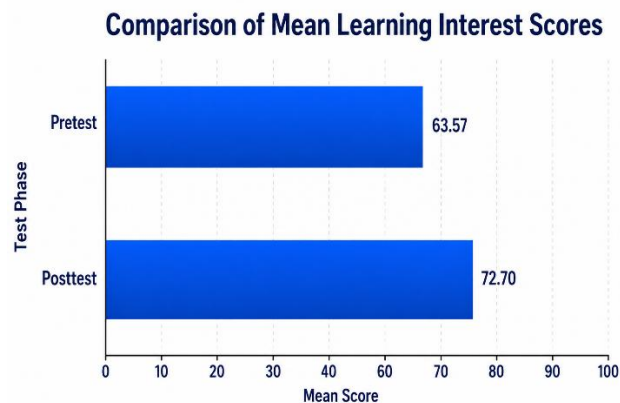
### **Descriptive Statistics**

Descriptive analysis was conducted to identify the characteristics of students' learning interest scores before and after the implementation of game warm-up activities. The results are presented in Table 1.

**Table 1.**  
 Descriptive Statistics of Learning Interest Scores

Statistics	Pretest	Posttest
N	37	37
Mean	63.57	72.70
Median	63.00	74.00
Mode	62	72
Standard Deviation	5.480	5.656
Variance	30.030	31.992
Minimum	53	58
Maximum	74	82
Range	21	24

Table 1 shows that the average learning interest score increased from 63.57 in the pretest to 72.70 in the posttest. This indicates an improvement of 9.13 points following the implementation of game-based warm-up activities. The highest score increased from 74 to 82, while the lowest score increased from 53 to 58. The standard deviation values for both measurements were relatively similar (5.480 and 5.656), indicating that score variability remained stable throughout the intervention. To illustrate the improvement in learning interest scores, Figure 1 presents the comparison between pretest and posttest mean scores.



**Figure 1.**

Comparison of Mean Learning Interest Scores

The figure clearly demonstrates a substantial increase in students' learning interest after participating in game warm-up activities during Physical Education lessons.

### Normality Test

Before conducting hypothesis testing, a normality test was performed using the Shapiro-Wilk and Kolmogorov-Smirnov tests. The results are presented in Table 2.

**Table 2.**  
 Normality Test Results

Variable	Kolmogorov-Smirnov Sig.	Shapiro-Wilk Sig.
Pretest	0.200	0.286
Posttest	0.144	0.115

The decision criterion states that data are normally distributed if the significance value is greater than 0.05. As shown in Table 2, the significance values for the pretest

(0.286) and posttest (0.115) were both greater than 0.05. Therefore, it can be concluded that the data were normally distributed and met the assumptions required for parametric statistical analysis. Furthermore, the Normal Q-Q Plot graph indicated that the data points were distributed closely around the diagonal line and followed the expected pattern. This suggests that the posttest data exhibited a normal distribution.

### Homogeneity Test

The homogeneity test was conducted using Levene's Test to determine whether the variances of the data were equal. The results are shown in Table 3.

**Table 3.**  
Homogeneity Test Results

Test Basis	Levene Statistic	Sig.
Based on Mean	4.144	0.003
Based on Median	2.520	0.038
Based on Trimmed Mean	4.026	0.004

The significance value based on the mean was 0.003, which is lower than the significance level of 0.05. Therefore, the data variances were considered not homogeneous. However, because the study used a paired sample design involving the same participants in both measurements, the paired sample t-test remained appropriate for hypothesis testing.

### Paired Sample t-Test

To determine whether there was a significant difference between students' learning interest scores before and after the implementation of game warm-ups, a paired sample t-test was conducted. The results are presented in Table 4.

**Table 4.**  
Paired Sample t-Test Results

Variable	Mean Difference	Std. Deviation	t-value	df	Sig. (2-tailed)
Before - After	-9.135	6.588	-8.435	36	0.000

The paired sample t-test revealed a mean difference of -9.135, indicating that posttest scores were substantially higher than pretest scores. The obtained t-value was -8.435 with  $df = 36$  and a significance value of 0.000.

Since the significance value was lower than 0.05 ( $p = 0.000 < 0.05$ ), the null hypothesis was rejected. This finding indicates that there was a statistically significant difference between students' learning interest scores before and after the implementation of game-based warm-up activities.

The results of this study demonstrate that game warm-up activities positively influenced students' interest in learning Physical Education, Sports, and Health. The mean score increased from 63.57 to 72.70, representing an improvement of approximately 14.36%. Statistical testing confirmed that this increase was significant ( $t = -8.435$ ;  $p < 0.05$ ). Therefore, game-based warm-up activities can be considered an effective instructional strategy for enhancing students' motivation and interest in participating in Physical Education learning activities at SMP Negeri 1 Bojongmangu.

## Discussion

The findings of this study demonstrate that the implementation of game-based warm-up activities significantly increased students' interest in learning Physical Education, Sports, and Health (PJOK) at SMP Negeri 1 Bojongmangu. The statistical analysis revealed a substantial improvement in students' learning interest scores, with the mean score increasing from 63.57 in the pretest to 72.70 in the posttest. Furthermore, the paired sample t-test yielded a t-value of -8.435 with a significance level of 0.000 ( $p < 0.05$ ), indicating that the intervention had a statistically significant effect on students' learning interest. These results suggest that game-based warm-up activities serve not only as a physical preparation strategy but also as an effective pedagogical approach capable of enhancing students' psychological engagement during learning activities.

From a pedagogical perspective, learning interest is a crucial determinant of successful educational outcomes because it influences students' attention, motivation, participation, and persistence in learning tasks. According to Achmad and Pramudiani (2022), learning interest consists of several dimensions, including enjoyment, attention, attraction, and active involvement. The increase observed in this study indicates that game-based warm-ups successfully stimulated these dimensions simultaneously. Students appeared more enthusiastic and actively engaged during PJOK lessons because the activities were perceived as enjoyable rather than obligatory physical exercises. Similar findings have been reported by Hidayat et al. (2021), Nugroho and Wibowo (2022), and Arifin et al. (2023), who found that enjoyable physical activities increase students' intrinsic motivation and participation levels in school-based physical education.

The effectiveness of game-based warm-ups can be explained through the framework of Self-Determination Theory (SDT), which emphasizes the importance of autonomy, competence, and relatedness in fostering intrinsic motivation. When students participate in enjoyable games, they experience a sense of competence through successful task completion, autonomy through active decision-making, and relatedness through interaction with peers. These psychological needs contribute to increased motivation and interest in learning (Ryan & Deci, 2020). Recent studies by Pratama et al. (2023), Yulianto and Kusuma (2022), and Rahman et al. (2024) further confirmed that physical education programs incorporating student-centered and game-oriented approaches significantly enhance learning engagement compared to conventional instruction.

The results of this study are consistent with previous empirical evidence. Chindi Yuliana (2024) reported that small-game interventions significantly improved students' learning interest at SMPN 7 Muara Bungo, with a significance value of 0.001 ( $< 0.05$ ). Likewise, Kurnia and Adha Septiana (2020) found that warm-up games increased students' participation and enthusiasm during PJOK lessons at SMPN 1 Sucinaraja. Similarly, Zulkarnain (2015) demonstrated a significant positive effect of game-based warm-ups, obtaining a t-value of 9.498, which exceeded the critical t-table value. The consistency of findings across different educational contexts strengthens the argument that game-based warm-ups represent an effective instructional strategy for enhancing students' learning interest.

Beyond increasing interest, game-based warm-ups may contribute to improved cognitive readiness for learning. Contemporary educational psychology suggests that physical activity stimulates cerebral blood flow, enhances neurotransmitter activity, and improves executive functions such as attention, memory, and concentration (Donnelly et al., 2016; Diamond, 2020). Consequently, students who engage in enjoyable physical games before the main lesson are more mentally prepared to absorb instructional content. Studies conducted by Lubans et al. (2021), Watson et al. (2022), and Pesce et al. (2023) demonstrated that physically active learning environments positively influence both academic engagement and cognitive performance among adolescents.

Another important explanation relates to the social dimension of game-based learning. Warm-up games generally require communication, cooperation, teamwork, and compliance with agreed rules. These interactions create a positive social atmosphere that supports learning engagement. According to Sari et al. (2024), holistic physical education should not only develop physical fitness but also cultivate social competence, emotional regulation, and character development. Similar conclusions were reached by Casey and Goodyear (2019), Dyson et al. (2020), and Hastie et al. (2021), who argued that collaborative physical activities enhance students' sense of belonging and strengthen social relationships, thereby increasing motivation to participate in learning activities.

The findings also support the growing body of literature emphasizing the importance of enjoyable learning experiences in physical education. Traditional warm-up routines are often repetitive and monotonous, causing students to perceive PJOK as less attractive. Conversely, game-based warm-ups transform the learning environment into an enjoyable and meaningful experience. Research by García-Hermoso et al. (2020), Beni et al. (2022), and González-Villora et al. (2023) found that enjoyment is one of the strongest predictors of long-term participation in physical activity among adolescents. Therefore, increasing learning interest through game-based warm-ups may have implications beyond classroom engagement by encouraging lifelong physical activity habits.

Practically, the results provide valuable implications for PJOK teachers. Teachers are encouraged to incorporate age-appropriate, enjoyable, and educational games into warm-up sessions to maximize student engagement. Such activities can function as a bridge between physical preparation and instructional objectives. Furthermore, game-based warm-ups can support broader public health goals by promoting active lifestyles and reducing sedentary behavior among adolescents. According to Nurdianti and Danang Dwi Basuki (2023), innovative PJOK learning strategies play an essential role in preventing obesity, improving physical fitness, and fostering healthy behavior patterns among school-aged children. Similar recommendations have been proposed by WHO (2022), Guthold et al. (2020), and Bull et al. (2020), who emphasized the importance of increasing youth participation in physical activity through enjoyable educational interventions.

In addition, game-based warm-ups can facilitate the development of affective and character-related outcomes. During games, students learn discipline, cooperation, honesty, responsibility, respect for rules, and sportsmanship. These values align with the objectives of contemporary physical education, which seeks to develop students

holistically rather than focusing solely on physical performance. Research by Bailey et al. (2019), Kirk (2020), and Suherman et al. (2023) highlights the role of physical education in character formation and social-emotional development, supporting the broader educational benefits observed in the present study.

Despite these promising findings, several limitations should be acknowledged. First, the sample consisted of only 37 students from a single school, which limits the generalizability of the findings to broader populations. Future studies should involve larger and more diverse samples from different regions and educational settings. Second, the use of purposive sampling may introduce selection bias because participants were selected based on specific criteria rather than randomization. Third, external variables such as parental support, peer influence, socioeconomic conditions, and school climate were not fully controlled. These factors may independently influence students' learning interest and could partially explain the observed improvements. Fourth, although the instrument demonstrated acceptable validity, only 25 out of 40 questionnaire items met the validity criteria, suggesting that further refinement of the measurement tool is necessary.

Overall, the present findings provide strong empirical evidence that game-based warm-up activities are an effective strategy for increasing students' interest in learning Physical Education, Sports, and Health. The significant improvement in learning interest scores, supported by theoretical perspectives and previous empirical studies, highlights the value of integrating enjoyable, interactive, and student-centered activities into PJOE instruction. Consequently, game-based warm-ups should be considered a practical and pedagogically sound approach for enhancing student engagement, promoting active participation, and supporting holistic educational development.

## CONCLUSION

Based on the discussion, it can be concluded that the warm-up of the game has an influence on the learning interest of students in learning physical education, sports and health, the lack of interest in learning physical education, sports and health due to the teaching method, the lack of variance in the heating and the lack of adequate facilities and infrastructure. By using warm-up games, students can show enthusiasm and involvement in learning, physical education, sports and health. In this research, a quantitative method with a pre-experimental design was used using pretest, treatment, and posttest to show a significant increase in learning interest after the application of game warm-up.

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