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The Effect of Music-Based Warm-Up Exercises on Student Active Participation in Physical Education at Public Senior High School 16 Bandung

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Abstract

This study aims to determine the effect of music-based warm-up modifications on students' active participation in Physical Education learning at Public Senior High School 16 Bandung. Music-based warm-up was chosen because music has been proven to improve mood, foster enthusiasm, and reduce student boredom. The background of the study stems from the problem of low student participation in Physical Education learning due to monotonous and less varied teaching methods. This study used an experimental method with a one-group pretest-posttest design. The research sample was 204 grade XII students selected using a simple random sampling technique. The research instrument was a student active participation questionnaire compiled based on Keith Davis's theory, supplemented by observation and documentation sheets. Data were analyzed using the Wilcoxon Signed Rank Test through SPSS 16.0 for Windows. The results showed a significant difference between the pretest and posttest scores, where the majority of students experienced an increase in active participation after being given music-based warm-up treatment. These findings indicate that music-based warm-up can create a pleasant learning atmosphere, meet students' psychological needs, and increase their intrinsic motivation. Thus, this innovative learning strategy can be an effective alternative to improve the quality of PE learning in secondary schools and encourage more optimal student involvement.

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INTRODUCTION

Physical education is an integral part of the national education system which functions to develop physical fitness, motor skills, critical thinking skills, and character formation (Budi, 2021; Ministry of National Education, 2008). Through physical activity, students not only practice psychomotor skills but also social, moral, and emotional values that support the development of a holistic personality. The success of physical education depends heavily on the teacher's creativity in designing engaging and meaningful learning (Budi, 2021).

In practice, Physical Education, Sports, and Health (PE) learning often faces challenges in the form of low student participation. This is often caused by monotonous teaching methods, a lack of varied activities, and minimal emotional involvement in the learning process (Ningsih & Rizki 2024). Students do enjoy outdoor activities, but this enthusiasm often isn't directed toward the content of the learning. This situation demands learning innovations that can stimulate deeper student engagement (Ningsih, 2024). This is in line with the opinion (Wiyono & Sumpena, 2018) which emphasizes that motivation and participation are dynamic factors that greatly determine student involvement in sports activities.

One important aspect of physical education (PE) is the warm-up. Warming up helps prepare the body physiologically and psychologically before engaging in more strenuous physical activity (Kiswantoko & Wijaya 2018). Unfortunately, warm-ups are often considered a boring routine, reducing student motivation from the start of the lesson. This is where teachers' roles are challenged by providing more engaging variations so that students don't just perform warm-ups as an obligation but also enjoy them as part of their learning (Kurnia & Septiana 2020).

One alternative innovation that can be implemented is a music-based warm-up. Music has a significant influence on a person's psychological state, such as improving mood, increasing enthusiasm, and reducing boredom (Kurnia & Septiana 2020). In the context of physical education, music-based warm-ups are believed to foster enthusiasm, improve focus, and stimulate social interaction among students. This way, learning becomes more lively and meaningful, rather than monotonous.

The concept of learning modification has long been introduced as a strategy for adapting materials, tools, and methods to suit students' needs. Modification is an effort to create and present something new, unique, and interesting without eliminating the main elements (Budi, 2021). In PE, music-based warm-up modifications are a concrete form of effort to present learning strategies that are relevant to students' interests while also supporting the achievement of learning objectives (Arif & Hartati, 2016; Bahagia & Suherman, 2000).

A number of previous studies have shown that the use of audio media or games in physical education can increase student participation (Septiani, 2017) proves that cheerful gymnastics songs are able to encourage students' interest and active participation (Ningsih, 2024) also emphasized the role of game-based learning in increasing student engagement. However, studies specifically highlighting the effect of music-based warm-ups on student active participation, especially at the high school level, are still very limited.

Against this backdrop, this study offers a novel approach in the form of implementing a modified music-based warm-up in physical education (PE) instruction in secondary schools. The novelty lies not only in the use of music as a medium, but also in the emphasis on warm-ups as a strategic initial phase of learning to foster active student participation (Librianty & Syarif, 2014; Suherman, 2009). This means that this research attempts to prove that a creatively packaged warm-up can be a gateway for student involvement in the entire physical education learning process.

Furthermore, music-based warm-ups are expected to meet students' needs for enjoyable, challenging, and meaningful learning. This innovation not only adds variety to the method but also supports the creation of a more conducive learning environment. Teachers also gain a simple yet effective alternative strategy for boosting student enthusiasm and participation (Aqib, 2010; Hasan et al., 2021). In this way, the holistic goals of physical education can be optimally achieved.

The practical implications of this research are to provide teachers with input to be more creative and innovative in designing learning. Meanwhile, theoretically, this research enriches the literature on music-based learning strategies in the context of physical education in secondary schools (Wake, 2016). This is important because learning innovations that are relevant to students' needs and characteristics will encourage improvements in the overall quality of education (Bailey et al., 2021).

Based on this description, this study focuses on testing the effect of music-based warm-up

modifications on the active participation of students at Public Senior High School 16 Bandung. The choice of music-based warm-up is based on empirical evidence and theory showing that music can improve mood, foster enthusiasm, and reduce student boredom in participating in learning (Karageorghis & Priest, 2012; Terry et al., 2020).

This strategy is relevant to the situation of middle school students, who tend to quickly become bored with conventional warm-up routines. Therefore, music-based innovations can be a more engaging and meaningful alternative. Through an experimental approach, this study seeks to provide empirical evidence regarding the effectiveness of music-based warm-ups as a learning strategy.

The purpose of this study is to determine the effect of music-based warm-up exercises on students' active participation in Physical Education learning at Public Senior High School 16 Bandung. Specifically, this research aims to measure changes in students' engagement levels before and after the implementation of music-based warm-up activities and to identify how these activities influence students' motivation, enthusiasm, and involvement during Physical Education lessons. The findings are expected to provide empirical evidence that supports the integration of music as an innovative pedagogical strategy to enhance student participation and learning quality in Physical Education

The novelty of this research lies in the application of music-based warm-up as a pedagogical innovation in Physical Education. While previous studies have mostly examined the role of music in improving exercise performance or creating a supportive atmosphere during sports activities, this study introduces a new focus on the warm-up phase as a strategic entry point for learning engagement. The integration of music during warm-up not only serves physiological preparation but also fulfills psychological and social needs, fostering students' intrinsic motivation, enjoyment, and active participation. This approach offers a fresh and practical contribution to the field of Physical Education by redefining the function of warm-up from a routine physical task into an engaging and motivational learning experience that supports holistic student development.

METHODS

This study used an experimental method with a one-group pretest-posttest design. This design was chosen because it allowed researchers to compare conditions before and after treatment in the form of a modified music-based warm-up to see its effect on students' active participation (Arikunto, 2010; Septiani, 2017). The research procedure was carried out in three stages, namely pretest, treatment for four meetings, and posttest.

The study population was all 204 students of class XII at Public Senior High School 16 Bandung. The sample was determined using a simple random sampling technique so that each student had an equal chance of being selected (Juliyanti & Pujiastuti, 2020; Sugiyono, 2013). From this population, 17 students were taken from each class as research samples.

The research instrument was a student active participation questionnaire adapted from research by Septiani (2017) and (Hermawan, 2016). The instrument was compiled based on Keith Davis's theory of active participation in Human Relations at Work, which includes five indicators: participation, involvement, willingness, willingness, and activeness. The questionnaire consisted of 60 statements with a Likert scale of 1–5, which after being tested for validity using Product Moment correlation resulted in 42 valid items, while 18 items were invalid. The reliability test using Cronbach's Alpha produced an r value of 0.997 which is in the very high category (Arikunto, 2013).

In addition to questionnaires, observation sheets completed by teachers and researchers were used to directly assess student engagement, as well as documentation in the form of photographs of learning activities as supporting data. Thus, data was obtained from a combination of student assessments, field observations, and visual evidence.

Data collection was conducted in three stages. First, a pretest with observations and questionnaires before the treatment. Second, the treatment consisted of a music-based warm-up session conducted over four sessions. Each warm-up session lasted 10–15 minutes and used popular, upbeat songs (120–140 bpm) selected in collaboration with the teacher and students to suit the characteristics of high school adolescents. The warm-up movements consisted of dynamic activities such as jogging, light jumps, hand-foot coordination, and simple stretches adjusted to the rhythm of the music. These modifications aimed to create a pleasant learning atmosphere, increase intrinsic motivation, and encourage student engagement from the beginning of the lesson. Third, a posttest with the same questionnaire was administered after the treatment..

Data analysis was carried out using the

SPSS 16.0 for Windows program(Fadluloh et al., 2024). The normality test was conducted using the Shapiro-Wilk test, while the homogeneity test used the Levene-Test. The test results showed that the data were not normally distributed, so the hypothesis testing was conducted using the non-parametric Wilcoxon Signed Rank Test at a significance level of 5% ($p \leq 0.05$) (Arikunto, 2013).

The Wilcoxon test was chosen because it is appropriate for comparing pretest and posttest results on paired data that are not normally distributed. With this approach, the analysis results not only show whether or not there are differences in students' active participation scores, but also provide an overview of the effectiveness of implementing music-based warm-ups as a learning strategy. Interpretation of the results of this analysis is important to understand its practical implications for PE teachers, namely that creative strategies that integrate music in warm-ups can encourage more active student engagement from the beginning of learning. Thus, the design of this research method is prepared transparently so that it can be replicated by other researchers in similar contexts.

RESULTS AND DISCUSSION

Students obtained an average score of 167.49 on the pretest with a standard deviation of 12.929, and their posttest scores increased to 175.20 with a standard deviation of 25.675. The lowest and highest scores also increased, from 103 to 240 on the pretest to 144 to 280 on the posttest. This indicates that the implementation of music-based warm-up modifications helps students be more active in participating in physical education learning. The results of the normality test analysis aim to determine whether the research data, both from the control and experimental groups, have a normal distribution. In this study, the normality test was conducted using the Kolmogorov-Smirnov method on the pretest and posttest data from both groups, each consisting of 15 respondents.

Based on the results of the normality test on the variable of student active participation in physical education learning, the significance value of the Kolmogorov-Smirnov and Shapiro-Wilk tests for the pretest and posttest data was 0.000. All of these values are below the 0.05 significance level, indicating that the distribution of student active participation data during the pretest and posttest was not normally distributed. Thus, the assumption of normality was not met, so further analysis could not use parametric tests. Therefore, to test the differences between the pretest and posttest, a non-parametric test was used, such as the Wilcoxon Signed Rank Test, which is more appropriate to the characteristics of the data.

Based on the analysis results of the Wilcoxon Signed Rank Test, it was found that there were 193 students who experienced an increase in active participation scores from pretest to posttest with a mean rank of 97.23 and a sum of ranks of 18,765.50. Meanwhile, there was only 1 student who experienced a decrease in score with a mean rank of 149.50 and a sum of ranks of 149.50. Meanwhile, 10 students showed the same score between pretest and posttest (ties). These results indicate that the majority of students experienced an increase in active participation after being given treatment in the form of a modified music-based warm-up. The dominance of positive ranks which was much greater than negative ranks or ties proved that this intervention was effective in encouraging active student involvement in Physical Education learning at Senior High School 16 Bandung.

Based on the analysis results using the Wilcoxon Signed Rank Test, the Z value was obtained = -11.927 with a significance of 0.000 ($p < 0.05$). These results indicate a significant difference between the pretest and posttest scores of students' active participation, so the hypothesis stating that music-based warm-up modifications have an effect on students' active participation can be accepted. Most students (193 people) experienced an increase in scores, only one student decreased, and ten students remained the same, so it can be concluded that this intervention is effective in increasing active participation.

These findings indicate that music-based warm-ups serve not only as physical preparation but also as a pedagogical strategy capable of increasing intrinsic motivation and student engagement from the outset of learning. This aligns with Self-Determination Theory (Deci & Ryan, 2000), where students' basic psychological needs autonomy, competence, and social connectedness can be met through fun and interactive activities such as music-based warm-ups. By meeting these needs, students are encouraged to participate more actively in Physical Education learning.

The results of this study are consistent with several previous studies (Septiani, 2017) shows that cheerful exercise songs are able to increase the interest in learning of elementary school students, while (Karageorghis & Priest, 2012) confirms that music has a significant psy-

chological influence on an individual's physiological and emotional responses to physical activity. Research by (Terry et al., 2020) also strengthens these findings with evidence that music can increase motivation, improve mood, and reduce boredom during exercise. Furthermore, (Bailey et al., 2021) emphasizes that creative approaches in physical education can support the development of motor skills, physical health, and social skills, so that the use of music in learning can be seen as a strategy that supports the holistic goals of physical education.

Practically, this study provides important recommendations for physical education teachers to integrate music into warm-up activities as a variation in their learning methods. This simple strategy has been shown to increase student engagement, create a more lively and inclusive learning environment, and strengthen their intrinsic motivation. Furthermore, this study also enriches the literature on the use of music in physical education contexts, particularly at the secondary school level in Indonesia, which is still limited.

The findings of this study contribute not only to learning practices but also to the development of theory in physical education. The innovation of a music-based warm-up can be seen as an effort to address the challenge of low student participation, while also providing a new direction for developing a more creative, contextual, and meaningful physical education curriculum for students.

This is in line with (Hambali et al., 2023) which emphasizes that sport not only improves physical performance but also serves as a means of developing life skills that impact adolescents' personal development. Overall, the results of this study emphasize the importance of music-based innovation in physical education and open up opportunities for further research to explore the influence of different types of music on student motivation and engagement.

CONCLUSION

This study shows that music-based warm-up modifications effectively increase students' active participation in Physical Education learning at Public Senior High School 16 Bandung. The results of the Wilcoxon Signed Rank Test prove a marked difference between pretest and posttest scores, where the majority of students experienced increased engagement after the treatment. These findings confirm that music-based warm-ups are able to create a pleasant learning atmosphere, fulfill students' psychological needs such as autonomy, competence, and social connectedness, and foster intrinsic motivation that leads to active participation in physical activities.

Thus, this innovative and contextual learning strategy can be a relevant alternative to improve the quality of Physical Education learning in secondary schools. In addition to providing practical contributions for Physical Education teachers, these findings also enrich the development of physical education theory by emphasizing the importance of a creative, music-based approach in the curriculum. However, this study is still limited to one school with a limited sample size. Therefore, further research is recommended to expand the scope to various levels of education and add other variables such as learning motivation, physical fitness, and psychosocial aspects to obtain a more comprehensive understanding of the effectiveness of this approach.

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