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The Effectiveness of Modern Music Based Physical Fitness Exercise on Students' Physical Fitness and Motivation in Physical Education

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ABSTRACT

This study aims to examine the effectiveness of modern music-based physical fitness exercise on students' physical fitness and learning motivation in physical education. A quasi-experimental method with a pretest–posttest control group design was employed to compare the outcomes between two groups. The participants consisted of 60 junior high school students, randomly assigned into an experimental group and a control group, each comprising 30 students. The experimental group participated in physical fitness exercises accompanied by modern music (pop and EDM), while the control group followed conventional exercise routines. Physical fitness was measured using the Indonesian Physical Fitness Test (TKJI), covering components such as endurance, strength, speed, and flexibility. Learning motivation was assessed using a validated questionnaire based on self-determination theory. Data analysis was conducted using independent t-tests to determine significant differences between groups. The results revealed that the experimental group demonstrated significantly greater improvements in physical fitness and learning motivation compared to the control group ($p<0,05$). The use of modern music enhanced students' engagement, rhythm coordination, and enthusiasm during exercise sessions, contributing to better overall performance and participation. In conclusion, modern music-based physical fitness exercise is an effective and innovative approach to improving both physical fitness and learning motivation among students. This method provides a more enjoyable and meaningful learning experience and can be recommended as an alternative strategy in physical education teaching practices to promote active participation and better learning outcomes.

Keywords : physical fitness exercise; modern music; learning motivation

ABSTRAK

Penelitian ini bertujuan untuk menguji efektivitas latihan kebugaran fisik berbasis musik modern terhadap kebugaran fisik dan motivasi belajar siswa dalam pendidikan jasmani. Metode kuasi-eksperimental dengan desain kelompok kontrol *pretest-posttest* digunakan untuk membandingkan hasil antara dua kelompok. Partisipan terdiri dari 60 siswa SMP, yang secara acak dibagi menjadi kelompok eksperimen dan kelompok kontrol, masing-masing terdiri dari 30 siswa. Kelompok eksperimen berpartisipasi dalam latihan kebugaran fisik yang diiringi musik modern (pop dan EDM), sedangkan kelompok kontrol mengikuti rutinitas latihan konvensional. Kebugaran fisik diukur menggunakan Tes Kebugaran Fisik Indonesia (TKJI), yang mencakup komponen seperti daya tahan, kekuatan, kecepatan, dan fleksibilitas. Motivasi belajar dinilai menggunakan kuesioner tervalidasi berdasarkan teori penentuan diri. Analisis data dilakukan menggunakan uji *t-independen* untuk menentukan perbedaan signifikan antar kelompok. Hasil penelitian menunjukkan bahwa kelompok eksperimen menunjukkan peningkatan yang signifikan dalam kebugaran fisik dan motivasi belajar dibandingkan dengan kelompok kontrol ($p<0,05$). Penggunaan musik modern meningkatkan keterlibatan siswa, koordinasi ritme, dan antusiasme selama sesi latihan, yang berkontribusi pada peningkatan kinerja dan partisipasi secara keseluruhan. Kesimpulannya, latihan kebugaran fisik berbasis musik modern merupakan pendekatan yang efektif dan inovatif untuk meningkatkan kebugaran fisik dan motivasi belajar

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di kalangan siswa. Metode ini memberikan pengalaman belajar yang lebih menyenangkan dan bermakna serta dapat direkomendasikan sebagai strategi alternatif dalam praktik pengajaran pendidikan jasmani untuk mendorong partisipasi aktif dan hasil belajar yang lebih baik.

Kata kunci : latihan kebugaran fisik; musik modern; motivasi belajar

INTRODUCTION

Physical education (PE) plays a fundamental role in promoting students' physical fitness, motor skills, and overall well-being. However, recent studies have shown that students' participation and engagement in PE classes tend to decline due to monotonous teaching approaches and limited instructional innovation (Chen et al., 2021; Liu et al., 2022). This condition contributes to low levels of physical fitness among students and reduced motivation to participate actively in physical activities during school hours.

In the context of 21st-century education, learning approaches are expected to be more student-centered, engaging, and meaningful (Mashud et al., 2023). One promising strategy to achieve this is through the integration of music into physical activity. Music has been widely recognized as a powerful stimulus that can enhance emotional engagement, enjoyment, and motivation in learning environments (Terry et al., 2020; Karageorghis et al., 2021). Therefore, incorporating music into PE learning may provide a more dynamic and enjoyable experience for students.

From a physiological perspective, music has been shown to improve exercise performance by regulating movement rhythm, increasing endurance, and reducing perceived exertion (Clark et al., 2022). In addition, music can stimulate cognitive processes such as attention and focus, which are essential for effective learning (Bigliassi et al., 2020). These findings highlight the potential of music as an integrative element in enhancing both physical and cognitive aspects of student performance.

Furthermore, modern music genres such as pop and electronic dance music (EDM) are closely related to students' cultural preferences. Research indicates that the use of preferred music significantly increases intrinsic motivation and active participation in physical activities (Stork et al., 2021). This suggests that aligning instructional methods with students' interests can create a more meaningful and enjoyable learning experience.

Despite these advantages, the application of music in PE is still relatively limited and often lacks structured implementation. Most previous studies have focused on the effects of music on sports performance or general physical activity, rather than its integration into formal PE learning contexts (Jones & Ekkekakis, 2021). As a result, there is still limited empirical evidence on how music-based exercise influences both physical fitness and learning motivation simultaneously.

Moreover, existing studies tend to examine physical fitness and motivation separately, without exploring their combined effects within a single instructional model. In modern educational settings, it is important to develop learning approaches that address both physical and psychological dimensions simultaneously (Vasconcellos et al., 2020). Therefore, a comprehensive approach that integrates music into physical fitness exercises is needed.

The urgency of this research is further emphasized by the increasing need to enhance students' motivation and physical fitness levels in PE learning. Without innovative strategies, students may continue to experience boredom and disengagement, leading to suboptimal learning outcomes (Sun et al., 2021). Thus, developing an engaging and effective learning model is essential.

The novelty of this study lies in the integration of modern music into structured physical fitness exercises within PE learning. Unlike previous studies that treat music as a complementary element, this research positions music as a central component of the instructional design aimed at improving both physical fitness and learning motivation.

Therefore, this study aims to examine the effectiveness of modern music-based physical fitness exercise on students' physical fitness and learning motivation in physical education. The findings are expected to contribute to the development of innovative, enjoyable, and effective PE learning strategies that support students' holistic development.

METHODS

Participants

The participants in this study were 60 junior high school students (aged 13-15 years) enrolled in a public school. The participants consisted of both male and female students who were physically healthy and actively participated in physical education classes. Inclusion criteria included : 1) no medical restrictions for physical activity; 2) regular attendance in PE classes; and 3) parental consent to participate in the study. All participants were informed about the research procedures and voluntarily agreed to take part in the study.

Sampling Procedures

A purposive sampling technique was employed to select participants who met the inclusion criteria. After selection, participants were randomly assigned into two groups: an experimental group (n = 30) and a control group (n = 30). Randomization was conducted to ensure equivalence between groups and to minimize selection bias. Both groups had similar characteristics in terms of age, gender distribution, and baseline physical fitness levels.

Materials and Apparatus

The instruments used in this study included :

1. **Indonesian Physical Fitness Test (TKJI)**, which measures several components of physical fitness such as endurance, strength, speed, agility, and flexibility.
2. **Learning Motivation Questionnaire**, adapted from the Self-Determination Theory framework (Deci & Ryan), consisting of validated items assessing intrinsic and extrinsic motivation.
3. **Audio system and music playlist**, consisting of modern music genres such as pop and electronic dance music (EDM) with a tempo range of 120-140 beats per minute (BPM), used during the intervention sessions.
4. **Observation sheets**, used to record students' attendance and participation during the intervention.

Procedures

The study was conducted over an 8-week period and consisted of three main stages :

1. **Pretest Phase** All participants underwent initial measurements of physical fitness using the TKJI and completed the learning motivation questionnaire.
2. **Intervention Phase** The experimental group participated in physical fitness exercise sessions accompanied by modern music, conducted three times per week. The exercises were designed to follow rhythmic movement patterns synchronized with the music tempo. Meanwhile, the control group performed conventional physical fitness exercises without modern music, following standard PE routines.
3. **Posttest Phase** After the intervention, both groups were reassessed using the same instruments to measure changes in physical fitness and learning motivation.

Design

This study employed a quasi-experimental design using a pretest-posttest control group design. This design allows for comparison between the experimental and control groups to determine the effectiveness of the intervention.

Data Analysis

Data were analyzed using statistical software. The following analyses were conducted :

1. **Normality test (Kolmogorov-Smirnov test)** to assess data distribution.
2. **Homogeneity test (Levene's test)** to examine variance equality between groups.
3. **Independent samples t-test** to compare posttest results between the experimental and control groups.
4. **Paired samples t-test** to analyze within-group differences between pretest and posttest scores.

The level of significance was set at $p<0,05$. Effect size (Cohen's d) was also calculated to determine the magnitude of the intervention effect.

RESULT AND DISCUSSION

Descriptive Statistics

Table 1 presents the descriptive statistics of physical fitness and learning motivation scores for both groups.

Table 1
Mean and Standard Deviation of Pretest and Posttest Scores

Variable	Group	Pretest (Mean ± SD)	Posttest (Mean ± SD)
Physical Fitness	Experimental	65,20 ± 6,10	78,45 ± 5,80
	Control	64,85 ± 5,95	70,10 ± 6,20
Learning Motivation	Experimental	68,30 ± 7,00	82,60 ± 6,50
	Control	67,90 ± 6,80	72,40 ± 7,10

Inferential Analysis

Table 2
Independent Samples t-test Results (Post-test)

Variable	t-value	p-value	Effect Size (Cohen's d)
Physical Fitness	5,21	0,000	1,10 (large)
Learning Motivation	5,67	0,000	1,20 (large)

The results showed a significant difference between the experimental and control groups in both physical fitness and learning motivation ($p < 0.05$). The effect sizes indicate a large practical impact of the intervention.

Explanation of Results

The findings indicate that both groups experienced improvements after the intervention; however, the experimental group showed substantially higher gains in both physical fitness and learning motivation. The increase in physical fitness in the experimental group (≈ +13,25 points) was notably higher than that of the control group (≈ +5,25 points). Similarly, learning motivation improved significantly in the experimental group (≈ +14,30 points) compared to the control group (≈ +4,50 points).

These results suggest that the integration of modern music into physical fitness exercise creates a more engaging and stimulating learning environment. Music likely enhanced movement synchronization, reduced perceived fatigue, and increased students' enjoyment, leading to higher participation and effort during exercise sessions.

Furthermore, the significant improvement in motivation indicates that music-based activities can foster intrinsic motivation, making students more enthusiastic and actively involved in physical education learning. This supports the idea that innovative and enjoyable instructional approaches are essential for improving both physical and psychological outcomes in education.

The findings of this study indicate that modern music-based physical fitness exercise significantly improves students' physical fitness and learning motivation compared to conventional approaches. This result is in line with previous research showing that music-integrated physical activity enhances both performance and engagement during exercise (Chtourou et al., 2021; Stork et al., 2022). The presence of music appears to provide an external stimulus that increases students' willingness to participate actively in physical education.

From a physiologicalperspective, the improvement in physical fitness observed in the experimental group can be explained by the role of music in regulating movement patterns and exercise intensity. Music with a consistent tempo has been shown to improve coordination and endurance during physical activity (Terry et al., 2020; Karageorghis & Jones, 2021). In this study, the use of modern music with a tempo of 120-140 BPM likely helped students maintain rhythm and sustain effort during exercise sessions.

In addition, music has been found to reduce perceived exertion and fatigue,

allowing individuals to perform physical activity more efficiently. Research by Karageorghis (2020) suggests that music can distract individuals from physical discomfort, thereby enhancing endurance and exercise duration. This mechanism may explain why the experimental group achieved higher improvements in physical fitness compared to the control group.

The significant increase in learning motivation can be attributed to the psychological effects of music during physical activity. Music has been shown to enhance mood, increase enjoyment, and stimulate intrinsic motivation in learning environments (Bishop et al., 2021; Clark et al., 2022). When students enjoy the learning process, they are more likely to engage actively and sustain participation in physical education activities.

Furthermore, the use of modern music that aligns with students' preferences plays a critical role in enhancing motivation. Adolescents tend to respond positively to contemporary music genres, which can create a sense of familiarity and emotional connection (Stork et al., 2021). This emotional engagement is essential in fostering intrinsic motivation and improving overall learning experiences in physical education.

The findings also highlight the importance of integrating music as a core component of instructional design rather than as a supplementary element. Previous studies have emphasized that structured music-based interventions are more effective in improving physical and psychological outcomes compared to unstructured use of music (Jones & Ekkekakis, 2021). In this study, music was systematically incorporated into exercise sessions, which contributed to the effectiveness of the intervention.

Moreover, this study supports the concept of holistic learning, where physical and psychological aspects are addressed simultaneously. Research by Vasconcellos et al. (2020) suggests that combining motivational strategies with physical activity leads to better learning outcomes and sustained engagement. The integration of music in physical fitness exercise represents a practical application of this holistic approach.

The large effect sizes observed in this study indicate that the intervention has strong practical significance. Similar findings have been reported in recent quasi-experimental studies, which show that music-based exercise programs can significantly enhance students' participation and motivation in physical education settings (Sun et al., 2021). This suggests that music can be used as an effective pedagogical tool to improve learning outcomes.

Despite these positive findings, several limitations should be acknowledged. The sample size was relatively small and limited to one school, which may affect the generalizability of the results. Additionally, the duration of the intervention was relatively short, and long-term effects were not examined. Future studies should involve larger samples, longer intervention periods, and diverse educational contexts to validate and extend these findings.

In conclusion, this study provides strong evidence that modern music-based physical fitness exercise is an effective and innovative approach in physical education. The integration of music not only enhances physical fitness but also improves learning motivation, making it a valuable strategy for creating

more engaging, enjoyable, and meaningful learning environments. These findings have important implications for educators in designing student-centered and innovative physical education programs.

CONCLUSION

This study concludes that modern music-based physical fitness exercise is an effective approach to improving both students' physical fitness and learning motivation in physical education. The integration of modern music into structured exercise activities significantly enhances students' engagement, movement coordination, and overall participation, leading to better physical performance compared to conventional methods.

Furthermore, the use of music creates a more enjoyable and meaningful learning environment, which positively influences students' intrinsic motivation and willingness to participate in physical activity. This indicates that combining physiological and psychological elements within a single instructional model can produce more optimal learning outcomes.

The findings of this study provide practical implications for physical education teachers to adopt innovative, student-centered strategies that align with students' interests and cultural preferences. Incorporating modern music into physical fitness programs can serve as an effective pedagogical tool to increase participation and improve learning outcomes.

Future research is recommended to explore long-term effects, involve larger and more diverse samples, and examine the impact of different music genres on various aspects of physical and psychological development in educational settings.

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