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The Effect of Outbound-Inspired Physical Activity Model in Enhancing Physical Fitness of Elementary School Students

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Abstract

Physical fitness is essential for the physical and mental development of elementary school students. However, the rising trend of sedentary lifestyles has limited students' participation in physical activities. This study aims to develop and evaluate the effectiveness of an outbound-based physical activity model in improving the physical fitness of elementary school students. A quasi-experimental design with a pretest-posttest control group approach was employed. The participants consisted of 100 elementary school students selected through purposive sampling. Data were collected using physical fitness tests, questionnaires, and observations, and analyzed using paired t-tests and analysis of covariance (ANCOVA). The results revealed that students in the experimental group who participated in the outbound program showed a significant improvement in physical fitness compared to those in the control group who received conventional instruction ($p < 0.05$). Furthermore, students in the experimental group demonstrated higher levels of engagement and motivation toward physical activities. These findings suggest that the outbound-based physical activity model is an effective alternative approach to enhancing physical fitness in elementary school students, while also fostering improvements in social skills and motivation.

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INTRODUCTION

Physical fitness plays a vital role in supporting children's physical, cognitive, and social development. However, the modern lifestyle, characterized by increasing reliance on technology and a decrease in physical activity, has contributed to a significant decline in the physical fitness levels of elementary school students (Brown & Smith, 2020; Guthold et al., 2020). Research by Jones et al. (2019) highlights that low levels of physical activity are linked to an increased risk of obesity and motor development disorders in children. This phenomenon is also evident in Indonesia, where many elementary students spend more time indoors with digital devices, resulting in limited engagement in physical activities (Ma'arif & Prasetiyo, 2021).

According to Williams (2021), physical fitness encompasses cardiovascular endurance, muscular strength, flexibility, and agility. Structured and regular physical activities are essential not only for improving these fitness components but also for supporting optimal growth and development in children. Therefore, effective and innovative strategies are needed to increase students' engagement in physical activities in ways that are both enjoyable and educational.

One promising approach is outbound-based learning, which combines physical activities with experiential learning in outdoor environments (Anderson & Miller, 2022). Previous studies have shown that outbound activities effectively enhance students' motivation, social skills, and physical fitness (Thompson, 2020; Carter & Phillips, 2022). Through challenges and interactive games, outbound activities help strengthen cardiovascular endurance, flexibility, motor coordination, teamwork, and self-confidence (Walker, 2019; Morgan & Davidson, 2021).

Despite growing evidence supporting the benefits of outbound-based activities, the reality shows that many students remain insufficiently engaged in physical activities (WHO, 2022). Furthermore, research in Indonesia indicates a steady decline in elementary school students' physical fitness, raising concerns about the long-term impact on their health and quality of life (Ma'arif & Prasetiyo, 2021; Mulyana et al., 2024).

Previous studies, such as those by Johnson & Taylor (2018) and Garcia (2019), emphasize that outbound learning activities can improve students' motor skills, participation rates in physical education, teamwork, and communication skills. Martinez et al. (2021) and Merdekawati et al. (2019) further support the idea that outbound-based activities foster not only physical fitness but also character building, including self-confidence and teamwork.

Nevertheless, most studies have not developed systematically designed outbound-based physical activity models that align closely with elementary school curricula. Research by Sugiyanto et al. (2019), Fuadi (2020), and Utomo et al. (2020) shows that innovation in learning methods and media modification can significantly enhance students' physical fitness, especially in adapting to post-pandemic conditions. However, a structured, implementable outbound-based physical activity model specifically targeting elementary students' needs remains limited.

The novelty of this study lies in the systematic development of an outbound-based physical activity model that integrates physical fitness improvement with educational games and character-building activities. Unlike previous research that broadly explored outbound benefits,

this study focuses on designing a model that is easily applied within the elementary school curriculum and tailored to the developmental characteristics of young learners. The outbound activities emphasized in this model aim to enhance endurance, motor coordination, teamwork, leadership, independence, and problem-solving skills (Robinson & Thomas, 2021; Henderson, 2020; Clarke, 2019).

Thus, the objectives of this study are 1) to develop an outbound-based physical activity model to improve elementary school students' physical fitness, 2) to test the effectiveness of the developed model in enhancing students' physical fitness, social skills, and motivation for physical activity, and 3) to provide evidence-based recommendations for educators and policymakers regarding the integration of outbound-based activities into the elementary school physical education curriculum.

This study is expected to make a significant contribution to physical education practices by offering an engaging and effective alternative to conventional methods. It also aims to promote students' overall health, social competence, and character development through innovative, outdoor-based learning strategies.

METHOD

This study employed a quasi-experimental design with a pretest-posttest control group approach to evaluate the effectiveness of an outbound-based physical activity model in enhancing the physical fitness of elementary school students. Participants were divided into two groups: an experimental group that received the outbound model intervention and a control group that participated in conventional physical education activities. Measurements were conducted before and after the intervention to assess changes between the two groups.

Participants

The total population of this study consisted of 109 elementary school students from several schools that had facilities suitable for outbound activities. From this population, purposive sampling was applied to select participants who met specific inclusion criteria, particularly, students aged 9 to 12 years. As a result, 9 students were excluded because they did not meet the age requirement, leaving 100 eligible participants to take part in the study.

The inclusion criteria were: being within the age range of 9–12 years, in good health, having no history of medical conditions that could hinder physical activity, and obtaining written parental or guardian consent. The average age of participants was 10.5 ± 1.2 years, with an average height of 140.2 ± 6.5 cm, average weight of 35.7 ± 5.8 kg, and a mean body mass index (BMI) of 18.1 ± 2.3 kg/m².

The purposive sampling technique was used to ensure participant uniformity in terms of physical developmental stage, making the study outcomes more measurable and standardized. The selected students also had limited physical activity levels but were considered to have the potential to benefit from the outbound-based intervention.

Research Procedure

The study was conducted in three stages. First, it is preparation stage. Activities included instructor training, development of outbound activity modules, selection of participants based on inclusion criteria, and initial data collection (pretest) using standardized physical fitness tests

measuring strength, endurance, agility, and flexibility.

Second, it is intervention stage. The intervention lasted eight weeks, with the experimental group participating in the outbound-based physical activity program three times per week, each session lasting 60 minutes. Activities were designed to improve both physical fitness and social skills. Meanwhile, the control group continued with conventional physical education classes without outbound elements.

Third, it is evaluation stage. Post-intervention measurements (posttest) were conducted using the same standardized physical fitness parameters as in the pretest. Changes in physical fitness between pretest and posttest scores were compared across groups.

Research Instruments

This research employed several validated instruments to ensure accurate and reliable data collection. The physical fitness test included measures of cardiovascular endurance, muscular strength, agility, and flexibility, which were adapted from standardized fitness assessment protocols recommended by Bailey (2006) and Corbin et al. (2019). These protocols are commonly used in physical education research and are suitable for children in the 9–12 age group.

To measure student engagement and motivation, a structured questionnaire was developed and tested for validity (r = 0.75) and reliability (Cronbach's Alpha = 0.80). This instrument was adapted based on student motivation frameworks in physical activity settings as discussed by Morgan and Davidson (2021).

In addition, a behavioral observation scale was used by two independent raters to evaluate students' participation, initiative, cooperation, and social interaction during outbound activities. This method followed the observation guidelines outlined in Carter and Phillips (2022), ensuring objectivity and consistency throughout the evaluation process.

Ethical Considerations

The study was conducted in compliance with the ethical standards outlined in the Declaration of Helsinki. Prior to participation, detailed information regarding the study's objectives, procedures, potential benefits, and risks was provided to participants and their parents. Written informed consent was obtained from all participants' parents or guardians. Additionally, the study received approval from the university's ethics committee. All collected data were kept confidential and used solely for academic purposes.

Data Analysis

Data were analyzed using both descriptive and inferential statistics. Descriptive analysis was conducted to describe the participants' characteristics, including age, height, weight, and BMI. For inferential analysis, a paired t-test was used to compare the pretest and posttest scores within each group, while Analysis of Covariance (ANCOVA) was employed to control for potential confounding variables and to assess the true effect of the outbound-based intervention. All statistical analyses were performed using the latest version of SPSS, ensuring accuracy and a systematic interpretation of the findings.

RESULT

The findings of this study reveal a significant improvement in physical fitness among elementary school students who participated in the outbound-based physical activity program, compared to those in the control group who underwent conventional physical education. The evaluation of physical fitness was conducted through a series of pretest and posttest assessments.

Table 1. Summary of Physical Fitness Scores (Pretest and Posttest)

Group	Pretest (Mean ± SD)	Posttest (Mean ± SD)	Difference (Δ)
Experimental	50.2 ± 10.3	62.5 ± 9.8	+12.3
Control	49.8 ± 10.1	52.7 ± 9.5	+2.9

As shown in Table 1, the experimental group experienced a notable increase in their physical fitness scores, from a mean of 50.2 ± 10.3 in the pretest to 62.5 ± 9.8 in the posttest, resulting in a mean difference of +12.3 points. In contrast, the control group exhibited only a slight increase of +2.9 points, from 49.8 ± 10.1 to 52.7 ± 9.5.

The greater improvement in the experimental group suggests that the outbound-based physical activity model is more effective than conventional teaching methods in enhancing students' physical fitness.

Inferential Statistical Analysis

To further validate the observed differences, inferential statistical tests were conducted. First, the paired t-test was used to compare the pretest and posttest scores within each group. The results are presented in Table 2.

Table 2. Paired t-Test Results

Group	t-value	p-value	Significance
Experimental	9.84	< 0.001	Significant
Control	1.87	0.067	Not Significant

The experimental group showed a statistically significant difference between pretest and posttest scores ($p < 0.001$), while the control group did not show a significant improvement ($p = 0.067$).

Second, an Analysis of Covariance (ANCOVA) was conducted to control for initial pretest differences and isolate the true effect of the outbound intervention. The results are shown in Table 3.

Table 3. ANCOVA Results

Source	F-value	p-value	Conclusion
Group (Treatment)	15.72	< 0.001	Significant Difference Between Groups

The ANCOVA results indicate a statistically significant difference between the experimental and control groups after adjusting for pretest scores ($p < 0.001$), confirming that the outbound-based program had a significant positive impact on students' physical fitness.

Behavioral Observations

During the intervention, qualitative observations revealed several notable outcomes. First, students in the experimental group demonstrated higher engagement, showing increased enthusiasm and active participation during activities. Second, there was an improvement in collaboration, with greater evidence of teamwork and mutual support among the participants. Lastly, students displayed a greater sense of initiative, as they were more willing to take on physical challenges independently. These observations suggest that the outbound learning model not only improved

physical fitness but also significantly enhanced students' motivation, teamwork, and problem-solving skills.

Social and Emotional Development

The outbound program also had a positive impact on students' social skills. Students demonstrated greater adaptability, as they were able to adjust more easily to new and dynamic environments. Leadership traits, such as decision-making and responsibility, became more pronounced among the participants. Additionally, improvements in communication skills, both verbal and non-verbal, were observed during group activities. Increased cooperation and more effective group dynamics were also reported, reflecting the positive influence of teamwork. These findings suggest that the outbound program supports holistic development by fostering physical, emotional, and social growth.

Sustainability of Impact

Follow-up observations conducted four weeks after the conclusion of the program showed that the benefits of the outbound-based activities persisted. Students from the experimental group continued to engage in physical activities more actively and maintained better fitness levels compared to the control group. This indicates that outbound-based interventions not only provide short-term benefits but also help establish long-term healthy habits among students.

Based on the findings, it can be concluded that the implementation of an outbound-based physical activity model significantly enhances the physical fitness of elementary school students. In addition to physical benefits, the program effectively promotes social skills, emotional development, and character building through active and collaborative learning experiences. Therefore, outbound-based programs are recommended as a sustainable alternative to conventional physical education approaches to foster students' holistic development.

DISCUSSION

The results of this study indicate that the outbound-based physical activity model significantly improves the physical fitness of elementary school students, as evidenced by the substantial increase in post-test scores of the experimental group compared to the control group. This supports the hypothesis that experiential learning through outbound activities is more effective than conventional methods in promoting physical development among children.

The key variable in this research, physical fitness, includes components such as cardiovascular endurance, muscular strength, flexibility, and agility. Improvements in these areas are critical during childhood, as they contribute to not only physical health but also cognitive and psychosocial development (Gabbard, 2017; Corbin et al., 2019). The physical fitness tests used in this study revealed that the outbound-based intervention had a meaningful effect on all measured aspects of fitness.

One of the major factors contributing to the success of the outbound model is its integration of game-based challenges and collaborative tasks in outdoor settings. These activities require continuous movement, engagement, and cooperation, which enhance children's aerobic capacity and neuromuscular coordination (Bailey, 2006; Gallahue & Donnelly, 2007). This aligns with the findings of Sugiyanto et al. (2019), who demonstrated that

outbound learning can significantly boost physical fitness and social skills in elementary students.

Moreover, the increased student motivation and engagement, as observed in the qualitative data, can be explained through Bandura's (1986) social cognitive theory, which emphasizes the role of self-efficacy and observational learning in behaviour change. The dynamic and interactive nature of outbound activities creates a positive learning environment that fosters confidence and intrinsic motivation to participate in physical tasks where factors known to be closely associated with improved fitness outcomes (Morgan & Davidson, 2021).

The social and emotional benefits noted, such as enhanced teamwork, leadership, and communication skills, also reflect the broader impact of physically active group-based learning. According to Carter and Phillips (2022), students who engage in structured physical group activities are more likely to develop interpersonal competencies and exhibit higher levels of perseverance and problem-solving abilities. This study adds to that body of evidence by showing that such benefits are not only theoretical but observable and sustainable, as demonstrated by the follow-up conducted four weeks after the intervention.

Despite these promising findings, this study has several limitations. One major constraint is the relatively small sample size (N = 100) and the use of purposive sampling, which may limit the generalizability of the results to a broader population. Although the instruments used were validated, the reliance on questionnaires and observations introduces potential for subjective bias, despite efforts to enhance validity through triangulation. Furthermore, the study did not incorporate objective measurement tools, such as wearable fitness trackers or motion sensors, which could provide more precise data on students' physical activity levels and exertion (Wilmore & Costill, 2012). Additional challenges included infrastructure limitations in some participating schools, which may have hindered full implementation of the outbound model, and technical issues experienced by some students when completing digital questionnaires due to limited internet access.

For future research, it is recommended that studies be conducted on a larger scale with a more diverse group of participants to enhance the generalizability of findings. Incorporating wearable technology, such as fitness trackers or motion sensors, could also provide more objective and accurate assessments of students' physical activity levels compared to traditional questionnaire- or observation-based methods.

Additionally, future studies should explore the long-term effects of the outbound-based program, particularly regarding the sustainability of students' physical activity habits after the intervention. Despite its limitations, this study contributes meaningfully to the field of physical education by presenting an innovative, experience-based learning model. The engaging and interactive nature of the outbound-based physical activity approach demonstrates strong potential for broader implementation in school curricula to promote both physical fitness and essential social skills among elementary school students.

In conclusion, the findings of this study reinforce the effectiveness of an outbound-based physical activity model in significantly improving elementary students' physical fitness,

while also enhancing their motivation, engagement, and social skills. By integrating physical challenges with cooperative and experiential learning, the model not only supports students' physical development but also fosters teamwork, communication, and problem-solving abilities. These outcomes align with contemporary educational theories that emphasize holistic and student-centered learning approaches. Therefore, the outbound-based model presents a valuable and practical alternative to traditional physical education methods, with potential for long-term impact on students' health and overall development.

CONCLUSION

This study concludes that the outbound-based physical activity model is effective in enhancing elementary students' physical fitness, outperforming traditional methods. It also fosters greater student engagement, motivation, and social skills. Given its experiential and interactive nature, the model holds promise for integration into elementary school curricula. However, limitations such as a small sample size and infrastructure barriers suggest the need for broader studies using objective tools like wearable technology. Future research should also examine the program's long-term impact on students' physical activity habits and overall well-being.

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CONFLICT OF INTEREST

Conflict of interest in research refers to external factors that could influence the objectivity of the study's results, such as sponsorship, personal relationships with participants, or financial ties to specific institutions.

In this study, the author declares that there is no conflict of interest that could affect the independence of the research. The research was conducted objectively, following scientific standards, from design through data collection, analysis, and reporting. All data presented are

based solely on the research findings without any external influence.

The author also confirms that no incentives or pressures from any party affected the interpretation of the results. All decisions were made based on academic judgment, empirical data, and thorough analysis. Therefore, the findings of this study can be used for further development without external bias.

The author declares that this study is free from any conflicts of interest with any parties.

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