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THE IMPACT OF SPORTS INFRASTRUCTURE AND PEDAGOGICAL COMPETENCE OF PHYSICAL EDUCATION TEACHERS ON THE INCREASE OF VOLLEYBALL

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Abstract

This quantitative study investigates the impact of sports infrastructure and the pedagogical competence of physical education (PE) teachers on the interest in volleyball among junior high school students in Medan City, Indonesia. With a focus on addressing the sedentary lifestyle prevalent among adolescents, the research aims to contribute to the enhancement of sports education by examining these key factors. Employing a structured questionnaire and utilizing SPSS version 27 for data analysis, the study analyzed responses from 54 participants through t-test, F-test, and coefficient of determination (R-square) tests. Findings indicate that both the quality of sports infrastructure and the competence of PE teachers significantly influence students' sports interest. Specifically, well-maintained facilities and skilled educators were found to collectively account for 67.1% of the variance in sports interest, highlighting their pivotal roles in promoting physical activities. The study underscores the need for a holistic approach in sports education, emphasizing the development of sports facilities and the enhancement of teacher training to foster a more inclusive and engaging sports culture among students.

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INTRODUCTION

Physical education (PE) plays a pivotal role in fostering a healthy and active lifestyle among adolescents, with sports being a significant component of this educational

sphere. The quality of sports infrastructure and the pedagogical competence of PE teachers are crucial factors that can influence students' interest and participation in sports activities. This study focuses on these factors within the

context of volleyball in junior high schools in Medan City. Given the growing concern about sedentary lifestyles among young people, this research aims to contribute to the ongoing discussions on enhancing sports education.

Recent research has emphasized the importance of adequate sports infrastructure in promoting students' physical activity and interest in sports (Julianto, 2016; Xie, 2021). Facilities such as volleyball courts, equipment, and access to well-maintained spaces are essential for engaging students in sports effectively. Studies have shown that the availability and quality of sports infrastructure significantly impact students' willingness to participate in PE classes and extracurricular sports activities (Abdelhamid & Elfakharany, 2020; Dauenhauer et al., 2022; Hao & Yang, 2022). These findings suggest that improving sports infrastructure in schools could be a vital step toward enhancing students' interest in sports, including volleyball.

The competence of PE teachers encompassing their knowledge, teaching skills, and ability to motivate students is another critical factor influencing students' sports participation. Effective teaching methods and positive teacher-student interactions can significantly enhance students' learning experiences and interest in sports (Franco et al., 2023; Koh et al., 2022; Tsai et al., 2020). Research indicates that teachers' enthusiasm, knowledge, and pedagogical skills play a significant role in encouraging students to engage in physical activities and pursue sports both within and outside the school environment (Farias et al., 2020; González-Calvo et al., 2021; Gultom et al., 2023).

Volleyball is a popular team sport that offers considerable physical, social, and psychological benefits. However, the level of interest in volleyball among junior high school students can vary widely, influenced by factors such as personal preferences, peer influence, and, importantly, the quality of sports infrastructure and teaching (Moulds et al., 2022; Sinaga & Sihombing, 2018). Understanding the

specific factors that contribute to volleyball interest in Medan City's schools can provide valuable insights for developing targeted strategies to promote this and other sports (Sinulingga et al., 2022).

Despite the recognized importance of sports infrastructure and teacher competence, there is a notable gap in quantitative research exploring their combined effect on volleyball interest among junior high school students, especially in the context of Indonesian cities like Medan. Most existing studies have either focused on broader aspects of physical education or on other sports, leaving a gap in the literature regarding volleyball (Leung et al., 2020; Nasrulloh et al., 2022). This study aims to fill this gap by providing quantitative data on the influence of these factors on students' interest in volleyball.

This quantitative study aims to assess the impact of sports infrastructure and the pedagogical competence of PE teachers on increasing volleyball interest among junior high school students in Medan City. It hypothesizes that both well-developed sports infrastructure and high pedagogical competence are positively associated with greater student interest in volleyball. By examining these relationships, the study seeks to offer insights that could guide the development of more effective PE programs and sports activities in schools (O'Connor & Penney, 2021; Sinaga et al., 2023).

Understanding the factors that influence students' interest in volleyball and other sports is crucial for developing strategies to promote physical activity among adolescents. This study's focus on the roles of sports infrastructure and teacher competence in influencing volleyball interest addresses a significant gap in the existing literature. By providing empirical data from junior high schools in Medan City, this research aims to contribute to the broader discourse on enhancing sports education and promoting a more active lifestyle among students.

METHOD

selection method ensured a representative subset

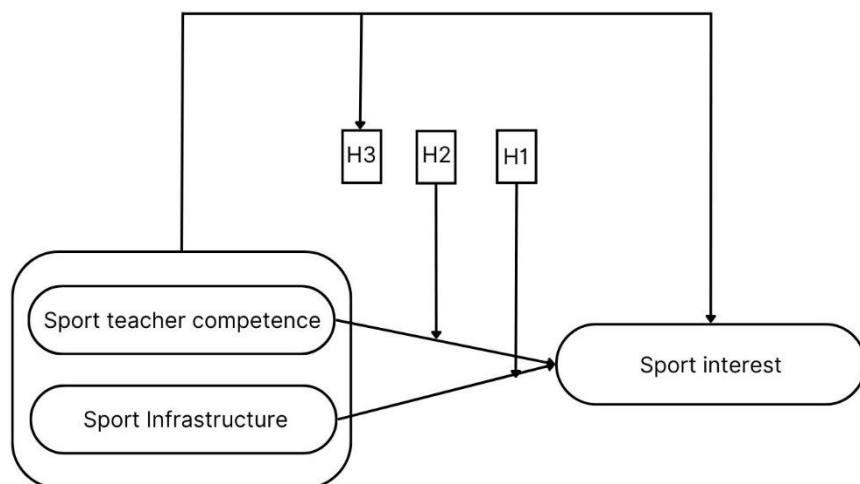


Figure 1. Conceptual Framework of this experiment.

Research Design

This study employed a quantitative research design to explore how sports infrastructure and the pedagogical competence of physical education teachers affect the interest levels in volleyball among junior high school students in Medan City. The investigation was conducted using a structured questionnaire as the primary data collection tool, ensuring a systematic approach to collecting responses from the participants.

Population and Sample

The population for this research comprised 120 authors who are experts in physical education and sports science, with a final sample of 54 authors selected using a stratified random sampling technique. This

Statistical Analysis

The data collected from the questionnaire were subjected to statistical analysis using SPSS software. The analysis included the use of the t-test and F-test to examine differences between groups, and the coefficient of determination (R-square) test to assess the strength and significance of the relationship between sports infrastructure, pedagogical competence, and volleyball interest. Furthermore, to understand the direct and indirect effects of the independent variables on the dependent variable, path analysis was conducted as part of the study.

of the population, allowing for generalizable and meaningful insights into the research question.

Data Collection

Data collection was conducted through an online survey utilizing Google Forms. The questionnaire was designed to gather information on participants' perceptions of sports infrastructure, the pedagogical competence of physical education teachers, and students' interest in volleyball. Prior to distribution, the questionnaire underwent a rigorous process of validity and reliability testing to ensure the accuracy and consistency of the measurement instruments (Sinaga et al., 2023; Sinaga & Sihombing, 2018; Wertz, 2022).

Drawing from the background information, the conceptual framework is depicted in Figure 1. Following this framework, the research hypotheses are formulated in the manner described below: Hypothesis 1 (H1): There is an impact of sports infrastructure on the interest in sports. Hypothesis 2 (H2): The proficiency of sports educators influences the enthusiasm for sports. Hypothesis 3 (H3): Both the quality of sports infrastructure and the expertise of sports teachers collectively affect the level of interest in sports activities.

RESULTS AND DISCUSSION

This meticulous statistical groundwork paved the way for examining the impact of

Table 1. T-test and significance table

Model		Unstandardized coefficients		Standardized Coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constants)	11.236	3.231		4.352	0.000
	S. I	0.251	0.118	0.423	2.877	0.012
	P.T.C	0.489	0.341	0.671	7.541	0.000

- a. Dependent variable: Sport variable
- b. Source of data: Output SPSS 27
- Abbreviation: S.I: Sport interest, P.T.C: Physical teacher competence

Table 2. ANOVA test table

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	70.342	3	103.693	27.236	0.000 ^b
	Residual	44.885	51	7.532		
Total		115.227	54			

- a. Dependent variable: Sport interest
- b. Predictors: (Constant), sport infrastructure, competence of physical teacher

Table 3. Model summary R square

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.671 ^a	0.741	0.632	1.551

- a. Predictors: (Constant), S.I_X1, P.T.C_X2
- b. Variable dependent: Sport interest

Analysis of t-test

In the realm of statistical analysis, the t-test serves as a crucial tool for assessing the significance of findings, operating under a predefined alpha level of 5% to maintain the rigor of hypothesis testing. Utilizing the comprehensive capabilities of SPSS version 27, this study meticulously calculated the critical value for t (t-table), which hinges on the formula $(0.05/2) = 0.025$, adapting to the specific degrees of freedom (df) determined by the equation $n-k-1$, where n represents the sample size, and k the number of predictors. For this investigation, with a sample of 54 participants and considering the model parameters, the degrees of freedom were precisely calculated as $(54-3-1) = 50$, leading to a t-table value of 2.023.

sports infrastructure and the competence of sports teachers on the burgeoning interest in sports among participants. The analysis unveiled that the quality and availability of sports infrastructure facilities hold a substantial, albeit partial, influence on fostering sports interest. This assertion is robustly supported by the data, where the computed t-value (2.877) not only exceeds the critical t-value of 2.023 but also aligns with a significance level (alpha, α) of 0.012, comfortably under the 0.05 threshold. Such findings underscore the pivotal role that tangible sports facilities play in encouraging active participation and enthusiasm towards sports.

Equally compelling is the discernible impact of sports teachers' competence on

nurturing sports interest. The statistical evidence, marked by a t-value of 7.541, significantly surpasses the critical benchmark (2.023), coupled with an exceptionally low significance level of alpha (α) at 0.000, far beneath the standard cut-off of 0.05. This highlights the indispensable influence of skilled and knowledgeable educators in shaping students' attitudes and interests towards sports. Their pedagogical proficiency not only serves as a cornerstone for effective teaching but also acts as a catalyst in motivating students, further elucidating the multifaceted dynamics at play in the educational sphere of physical education.

Together, these insights not only validate the hypotheses posited but also enrich our understanding of the complex interplay between physical infrastructure, educational competence, and student engagement in sports activities. By navigating through statistical rigor and empirical analysis, this study contributes valuable perspectives on optimizing educational practices and infrastructural provisions to enhance sports involvement among youth, setting a precedent for future research in the field.

Analysis of F-test

In the F-test analysis, the threshold of significance is set at a p-value of < 0.05 to determine the impact of independent variables on a dependent variable. The findings derived from the analysis, as highlighted by SPSS version 27, indicate a p-value of 0.000, which is substantially lower than the 0.05 threshold. This statistically significant outcome underscores that both the sports infrastructure and the teaching competence of sports educators exert a noteworthy and simultaneous influence on the level of interest in sports among participants. Further corroborating this conclusion is the F-value obtained from the analysis, standing at 27.236, which surpasses the critical value of 10.00. This significant F-value reiterates the substantial impact that both the availability of quality sports facilities and the proficiency of sports teachers have in fostering a positive and

marked effect on sports interest. Such results highlight the integral roles that both infrastructure and educator competence play in enhancing the engagement and enthusiasm towards sports activities, emphasizing the synergistic effect they have when considered in tandem.

Coefficient of Determination R Square

The analysis of the data, as indicated by the r-square value obtained from the model summary table, reveals a compelling insight into the dynamics between the independent variables - sports infrastructure and the pedagogical skill of sports teachers and the dependent variable, which is the level of interest in sports activities. With an r-square value of 0.671, or 67.1%, the data demonstrates that these independent variables collectively account for two-thirds of the variation in sports interest among the subjects of the study. This significant percentage underscores the critical role that both physical resources and the quality of instruction play in fostering an enthusiasm for sports. However, it's crucial to acknowledge that the remaining 32.9% (1 - 0.671) of the influence on sports interest is attributed to factors not covered in this research. This unexplored variance hints at the presence of additional determinants that could also play a significant role in shaping sports interest.

Among these are environmental influences, as noted by studies such as those by Ladhari, Triantafyllidis, and Darwin (Ladhari et al., 2022; Triantafyllidis & Darwin, 2021) which suggest the impact of the surrounding physical and social environment on sports participation. Health motivation, highlighted in research (Martín-Rodríguez et al., 2024; Tidmarsh et al., 2022), points to the intrinsic and extrinsic motivations related to health that drive individuals towards sports. Furthermore, appearance motivation, as discussed by Dimas and Durau (Dimas et al., 2021; Durau et al., 2022), indicates a significant influence where the desire for an improved physical appearance motivates sports participation. These

unexamined variables represent critical areas for further investigation to provide a more comprehensive understanding of what drives interest in sports.

The study delves into the intricate relationship between sports infrastructure and its influence on fostering an interest in sports activities among individuals. At the heart of this investigation lies the understanding that sports infrastructure serves not just as a mere backdrop but as a pivotal element that significantly enhances the quality and experience of engaging in physical activities, such as push-ups, pull-ups, and various others. The essence of sports infrastructure, as highlighted in the seminal work of Evan (Evans, 2021), is encapsulated within three core principles that underscore its importance: availability, equipment, and maintenance.

Availability pertains to the accessible range of sports facilities that cater to both students and the broader community, including but not limited to playing fields, instructional aids, and skilled coaching personnel. The principle of equipment emphasizes the necessity for a comprehensive array of physical fitness tools ranging from treadmills and skipping ropes to dumbbells that facilitate a wide spectrum of exercises. Maintenance, the third principle, underscores the imperative of upkeeping these facilities and equipment to ensure their ongoing utility and safety for users. The collective fulfillment of these criteria availability, completeness, and diligent maintenance forms the cornerstone for nurturing a vibrant interest in sports, manifesting through increased involvement in sporting activities, a pronounced liking for specific sports such as football, futsal, volleyball, and badminton, and a heightened level of attention and engagement with the chosen sport.

The significant impact of sports infrastructure on stimulating interest in sports is corroborated by empirical evidence from research conducted by Chang, Volf, and Kovács & Pusztai (Chang et al., 2020; Kovács & Pusztai,

2023; Volf et al., 2022), further substantiating the hypothesis that well-provisioned sports infrastructure has a tangible effect on sports enthusiasm. This assertion is statistically supported by the results of the study, where the t-value exceeds the critical t-threshold ($2.877 > 2.023$) with a significance level (alpha, α) of 0.012, falling below the 0.05 threshold, indicating a significant partial effect of sports infrastructure on sports interest. The acceptance of Hypothesis 1 (H1 Accepted) illuminates the crucial role that sports infrastructure plays in catalyzing a deep-rooted interest in sports, thereby highlighting its indispensable value in promoting physical activity and wellness in the community.

The pivotal role of a sports teacher's competence in kindling and nurturing an interest in sports among students is a multifaceted aspect that encompasses a broad spectrum of knowledge, skills, and attitudes essential for effective teaching in the realm of physical education. A sports teacher's expertise is not confined to mere familiarity with various sports but extends to a comprehensive understanding and mastery of technical skills specific to the sports being taught, coupled with adept classroom and activity management to ensure a conducive and safe learning environment. This proficiency includes not only the capability to organize and execute sports activities efficiently but also the crucial competence in ensuring safety through preventive measures and the provision of immediate first aid in case of accidents or injuries during sporting events. Moreover, a nuanced understanding of students' physical and psychological conditions is imperative, allowing for tailored instruction that minimizes risks and maximizes the benefits of sports participation.

Within this context, the competencies vital for a sports teacher are categorized into distinct yet interconnected domains: foundational knowledge of sports disciplines, technical prowess in sports execution, effective management of sports activities and learning

spaces, proficiency in safety protocols and emergency response, and a sensitive appreciation of student-specific conditions and developmental stages. Such a holistic skill set not only enhances the quality of sports education but also significantly impacts students' enthusiasm and engagement with sports. This engagement is manifested in a marked increase in students' interest and active participation in sports activities, spurred by their trust in the teacher's competence and an inviting, secure, and supportive learning environment.

Empirical studies, including those conducted by Jacobs, Storr, and Wu (Jacobs et al., 2022; Storr et al., 2022; Wu et al., 2023), affirm the substantial influence of sports teachers' competencies on fostering sports interest among students. The statistical evidence, with a t -value surpassing the critical threshold ($7.541 > 2.023$) and an alpha significance level of 0.000, well below the 0.05 benchmark, conclusively demonstrates the significant effect of a sports teacher's competence on students' sports interest. The acceptance of hypothesis 2 (H2 Accepted) underscores the indispensable role of skilled, knowledgeable, and empathetic sports teachers in cultivating a vibrant, inclusive, and enthusiastic sports culture within educational settings.

The dynamic interplay between sports infrastructure and the expertise of sports educators forms a critical foundation for engaging students in physical activities. Such infrastructure includes not only the physical spaces and fields designated for sports but also the essential equipment and aids that facilitate training and practice. Equally crucial is the role of sports teachers, whose competencies spanning knowledge, skills, and the right attitudes are fundamental in ensuring that sports activities are both safe and effective for students.

Students' interest in sports is significantly influenced by their perceptions of the available infrastructure and the quality of instruction they receive. The existence of well-equipped sports facilities, coupled with the presence of skilled

and knowledgeable teachers, creates a conducive environment that naturally attracts students to participate in sports. The competencies of these teachers extend beyond their technical expertise; they embody the capacity to inspire, motivate, and guide students towards embracing and excelling in various sports disciplines.

This combined effect of sports infrastructure and teacher competence on stimulating students' interest in sports is not merely anecdotal but is supported by empirical research, as evidenced by studies from (Gultom et al., 2021; Krause et al., 2020). These investigations highlight the symbiotic relationship between the physical and instructional components of sports education and their collective impact on student engagement. Statistical analysis reinforces this connection, with the f -count significantly surpassing the f -table value ($27.236 > 10.00$) and demonstrating a significance level of alpha (α) at 0.000, which is well below the conventional threshold of 0.05. This outcome confirms the simultaneous and substantial influence of both infrastructure and teacher competence on the development of sports interest among students, validating the hypothesis (H3 Accepted).

Such findings underscore the importance of a holistic approach to sports education, one that equally prioritizes the development and maintenance of sports facilities and the ongoing training and professional development of sports educators. By addressing these dual aspects, educational institutions can significantly enhance the quality of their sports programs, fostering a more vibrant and inclusive culture of sports participation that benefits all students.

CONCLUSION

Drawing from the comprehensive analysis presented in the literature review and subsequent discussions, the researchers have arrived at several key conclusions: Firstly, infrastructure facilities significantly enhance sports interest, providing essential support for the optimal

execution of sports activities. Secondly, the expertise of sports teachers plays a crucial role in augmenting sports interest, as their proficiency ensures effective guidance for students in sports endeavors. Lastly, it has been determined that the combination of sports infrastructure and teacher competence collectively exerts a substantial and positive influence on sports interest among students. This synergy underscores the importance of both well-maintained sports facilities and highly skilled educators in fostering a dynamic and engaging sports environment.

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