Enhancing motivation, physical activity, and motor skills through a sport management program based on the sport education model

Mejorando la motivación, la actividad física y las habilidades motoras a través de un programa de gestión deportiva basado en el modelo de educación deportiva

Authors

Dennys Christovel Dese [1]
Cahyo Wibowo [2]

[12] Satya Wacana Christian University (Indonesia)

Corresponding author:
Dennys Christovel Dese
dennys.christovel@uksw.edu

How to cite in APA

Dese, D. C., & Wibowo, C. (2025). Enhancing motivation, physical activity, and motor skills through a sport management program based on the sport education model. *Retos*, *64*, 589–600. https://doi.org/10.47197/retos.v64.110949

Abstract

Introduction: Physical education is essential in fostering children's motivation, motor skills, and physical activity habits, particularly at the elementary school level.
Objective: This study explores the effectiveness of sports management based on the sport education model as an innovative approach to physical education in schools to enhance students' motivation, physical activity, and motor skills.
Methodology: The research design employs a static group comparison experiment with two groups an experimental group receiving sport education model intervention and a control group following conventional learning. The sample consists of 120 students aged 8-9 years, divided into two groups, each comprising 60 students. Data were collected using a sports motivation questionnaire, the Physical Activity Questionnaire for Children, and a motor skills instrument measuring balance, locomotor, and manipulative movements.
Results: Statistical analysis results indicate that the sport education model group had significantly higher post-test scores in motivation, physical activity, and motor skills than the control group. Discussion: Conventional pedagogical models have potential effectiveness if supplemented with individualized attention and purposeful goal-oriented feedback.
Conclusions: sport education model has the potential to be an effective method in physical education for enhancing student engagement and physical abilities.

Keywords

Motivation; physical activity; motor skills; sports management; sport education model

Resumen

Introducción: La educación física es esencial para fomentar la motivación, las habilidades motoras y los hábitos de actividad física de los niños, particularmente en el nivel de la escuela primaria.
Objetivo: Este estudio explora la efectividad de la gestión deportiva basada en el modelo de educación deportiva como un enfoque innovador de la educación física en las escuelas para mejorar la motivación de los estudiantes, la actividad física y las habilidades motoras.
Metodología: El diseño de investigación utiliza un experimento de comparación de grupos estáticos con dos grupos: un grupo experimental que recibe la intervención del modelo de educación deportiva y un grupo control que sigue el aprendizaje convencional. La muestra consiste en 120 estudiantes de 8-9 años, divididos en dos grupos, cada uno compuesto por 60 estudiantes. Los datos se recopilaron utilizando un cuestionario de motivación deportiva, el Cuestionario de Actividad Física para Niños y un instrumento de habilidades motoras que mide el equilibrio, los movimientos locomotores y los manipulativos.
Resultados: Los resultados del análisis estadístico indican que el grupo del modelo de educación deportiva tuvo puntajes significativamente más altos en las pruebas posteriores en motivación, actividad física y habilidades motoras en comparación con el grupo control.
Discusión: Los modelos pedagógicos convencionales pueden tener eficacia si se complementan con atención individualizada y retroalimentación dirigida a metas claras.
Conclusiones: El modelo de educación deportiva tiene el potencial de ser un método efectivo en la educación física para mejorar el compromiso de los estudiantes y sus habilidades físicas.

Palabras clave

Motivación; actividad física; habilidades motoras; gestión deportiva; modelo de educación deportiva

Introduction

Physical activity during childhood significantly impacts physical, cognitive, and emotional development, particularly in elementary school-aged children (Bidzan-Bluma & Lipowska, 2018; Latino & Tafuri, 2023). Children aged 8 to 9 years are in a critical developmental phase, where participation in physical activity supports physical growth and contributes to the development of fundamental motor skills essential for daily life and future sports participation (Li et al., 2019). Research indicates that structured physical activity at this age can enhance motor skills, physical fitness, and cognitive function while also fostering social engagement and positive emotional experiences among children (Bulten et al., 2022; Dapp et al., 2021a; Donnelly et al., 2016). However, in many elementary schools, PE often needs more direction in motivating students and enhancing their motor skills. Existing programs tend to be monotonous and fail to leverage the full potential of interactive, experience-based activities, resulting in low participation and motivation among students in physical activities. Therefore, it is crucial to develop effective and structured learning models that aim to improve physical skills and motivate students to engage actively in PE.

One of the main challenges in PE at the elementary school level is the low motivation of students to participate in physical activities. This lack of motivation affects students' engagement levels in PE and the development of essential motor skills. Previous research has indicated that insufficient motivation can lead to decreased participation in physical activities, which hinders the development of motor skills and physical fitness in children (Dapp et al., 2021b; Firth et al., 2016). This is particularly concerning for children aged 8 to 9 years, during which motor and physical development are at a critical stage. Traditional PE often needs to provide sufficiently engaging approaches to stimulate students' interest and active participation, making many students feel alienated from physical activities. Consequently, there is a need for more effective interventions based on models that have been shown to enhance students' motivation and physical engagement. Research findings suggest that implementing sport management or physical activity programs is an innovative global intervention (Carranza-Bautista, 2020).

Motivation in this context is not only limited to the desire to participate but also includes self-determined motivation that encourages students to voluntarily and intrinsically engage in physical activity (Mayorga-Vega et al., 2019). This motivation model suggests that when students experience fun and enjoyment from physical activity, they are more likely to participate actively and sustainably (Gråstén & Watt, 2017). Unfortunately, traditional PE cannot often provide an engaging approach to stimulate students' interest and active engagement, resulting in many students feeling alienated from physical activity. Model-based interventions that have been proven to increase students' motivation and physical engagement are needed as a solution. One innovative approach recommended is the implementation of SEM, or intrinsically motivated physical activity that emphasizes aspects of fun and enjoyment (Tendinha et al., 2021a). This approach can create a more engaging learning experience, reduce students' alienation levels, and ultimately support the development of their motor skills and physical fitness.

Implementing sport management as an innovative intervention in PE aims to enrich students' learning experiences through a more structured and participatory approach. As a discipline encompassing the planning, organization, and evaluation of sporting activities, sport management enables students to engage physically and develop cognitive and social competencies. In this approach, students are assigned active roles throughout various stages of activities, including planning and execution, which aids in enhancing their self-management skills, collaboration, and leadership abilities.

Globally, the intervention of sport management in PE, mainly based on the SEM, is recognized for fostering a learning environment that promotes physical fitness and cultivates social skills and important values such as sportsmanship, discipline, and social responsibility. Under the sports management model, school sports programs serve as a medium to integrate principles of health and fitness, introducing students to sustainable active living patterns. Through well-designed activity structures, students are exposed to concepts of healthy competition and teamwork, ultimately contributing to the establishment of exercise habits that positively impact their health in the future. Sports management within the SEM can significantly enhance student motivation by providing a competitive yet collaborative learning environment, encouraging students to participate actively in

physical activities and improve their motor skills (Manninen & Campbell, 2022a; Schiff & Supriady, 2023; Tendinha et al., 2021b).

Despite the rapid advancement of research in PE, there remains a significant gap in applying innovative approaches to enhance motivation and motor skills among elementary school-aged children. Most studies on the SEM, for instance, have primarily focused on secondary and higher education students. In contrast, the implementation of SEM with elementary school students, particularly those aged 8 to 9 years, has been infrequently explored. Existing research indicates that SEM can improve motivation, cooperation, and social skills among older students; however, there is insufficient empirical evidence addressing its effectiveness at the elementary school level (Kao, 2019; Méndez-Giménez et al., 2022; Montoya et al., 2020). This gap becomes increasingly critical considering the importance of the motor development period in elementary school children, which has long-term implications for their physical engagement in adulthood. Additionally, the SEM based sport management approach, which focuses on enhancing student involvement and managing physical activities, has not been extensively discussed within the context of PE in elementary schools.

This study introduces a novel approach to sport management based on the SEM applied to elementary school students aged 8 to 9 years, a demographic that has rarely been the primary focus in previous research. Although SEM has proven effective in enhancing motivation, participation, and motor skills among secondary school students, its implementation for elementary school-aged children still needs to be improved, particularly within the context of structured PE (Choi et al., 2021; Zhang et al., 2024). The justification for this research lies in providing a more targeted approach for children during this critical phase of motor development. This study not only adds a new dimension to the existing literature but also significantly contributes to the practice of PE in elementary schools. The SEM-based sports management program offers a competitive yet collaborative learning environment, allowing students to develop physical skills and enhance their motivation and overall physical activity.

Based on various findings and gaps in the literature, this study explores how implementing a sport management program based on the SEM can enhance motivation, physical activity, and motor skills among elementary school students aged 8 to 9 years. The research seeks to evaluate the effectiveness of SEM in creating a more engaging and participatory learning experience for elementary school students, with the hope of increasing their motivation to participate in physical activities and developing essential motor skills. The results of this study are expected to contribute to advancing more effective and evidence-based practices in PE at the elementary level.

Method

Participants

This study involves participants from the Kurma Islamic Elementary School in Salatiga, aged between 8 and 9 years old (M = 8,5; SD = 0,5), specifically from grades 2 and 3. Participants were selected using purposive sampling techniques, taking into account age, grade, and involvement in PE at school (Bayu et al., 2022). A total of 120 students were included, divided into two groups: 60 students were assigned to the experimental group, which will receive the sport management intervention based on the SEM, while the other 60 students were placed in the control group, which will receive conventional sport management PE.

Procedure

This study employs an experimental approach with a static group comparison design consisting of two experimental and control groups. A quasi-experimental design was used in this study because conditions in the field did not allow for complete randomization of participants. In this case, the groups of students formed naturally based on the existing classes in the school. Although randomization was not done, the quasi-experimental design is still considered valid and appropriate for evaluating the effectiveness of interventions in educational settings. This design allows comparisons between intervention and control groups while maintaining an adequate level of internal validity through the control of other relevant variables (Handley et al., 2018; White & Sabarwal, 2014).The experimental group will receive an intervention based on the SEM, while the control group will participate in the

conventional intervention program provided by the school. The learning program has been systematically designed from the outset of the research, aiming to ensure that the interventions for both groups are effectively implemented and aligned with the student's needs.

The intervention for the experimental group will be conducted over 8 weeks, with each learning session lasting 70 minutes. During this period, students in the experimental group will engage in physical activities designed with SEM elements. The intervention was conducted over eight sessions, each lasting 70 minutes, based on pedagogical, physiological, and practical considerations relevant to the research objectives and the characteristics of 8–9-year-old students. Pedagogically, eight sessions are deemed sufficient to introduce the foundational concepts of the SEM, provide opportunities for students to practice their skills, and evaluate their progress. The 70-minute duration per session offers adequate time to complete various learning stages, such as introducing material, practicing, and reflecting, without causing fatigue or losing focus among students.

From a physiological perspective, 8–9-year-old students have limited attention spans and physical capacities. The 70-minute duration ensures students remain physically and mentally active without compromising learning effectiveness due to fatigue. If the session duration were shorter, it might not provide enough time to complete all planned activities, whereas longer sessions could reduce student engagement. Furthermore, eight sessions are ideal to allow sufficient intervention time for students to achieve the expected outcomes, such as improvements in basic motor skills, manipulative skills, and teamwork, without being overly lengthy, which might lead to boredom or misalignment with school schedules. The choice of eight sessions is also supported by previous studies showing that similar intervention periods effectively measure the impact of pedagogical models.

The sports used in the SEM approach involve team game-based activities to develop basic motor manipulative and strategic skills through match simulations and mini-tournaments. Activities such as running, jumping, and dodging in team games serve to improve basic motor skills. In contrast, ball manipulation games such as catch and throw are designed to hone students' manipulative skills. The selection of these activities is relevant to the developmental characteristics of 8-9-year-old students and aims to ensure that at least 80% of students experience improvement in these skills. In addition, forming teams, managing training schedules, and matching simulations encourage students to learn strategy, collaboration, and responsibility in groups. Students can practice skills in an educational competitive atmosphere through mini-tournaments, learn event management, understand rules, and develop sportsmanship's value. SEM is designed to create fun learning and motivate students independently while providing space for individual reflection and team performance evaluation. This approach not only strengthens students' physical skills but also instills educational values such as cooperation, responsibility, and respect for each other's roles in the team.

Table 1. Summary of the SEM-based sport management learning program design

Week 1-8					
SEM			Conventional Model		
Topic	Activity	Criteria	Topic	Activity	Criteria
SEM concepts and roles in the team	Introduction to SEM concepts	observation	SEM Concepts and Roles in Teams	Explanation of sports theory without implementing team concepts	Observation
Basic locomotor skills	run, jump and dodge in the form of a team game	At least 80% of students show development of locomotor skills	Basic locomotor skills	Individual practice of locomotor skills without team context	At least 80% of students show development of locomotor skills
Team strategy and training schedule management	Team formation, Practice schedule	Teams can organize their training schedules effectively.	Team strategy and training schedule management	No team formation or training organization	Teams can organize training schedules effectively
manipulative skills	Ball manipulation practice through catch and throw games between teams	At least 80% of students are able to perform manipulative movements	manipulative skills	Individual ball manipulation practice without interaction between students	At least 80% of students are able to perform manipulative movements
Skills in simulation matches	Team match simulation with focus on locomotor and manipulative skills	Students demonstrate coordination and teamwork skills	Skills in simulation matches	Individual practice of skills without team coordination	Students demonstrate coordination and teamwork skills
Preparing and managing mini-tournaments	Mini tournament planning (schedule, rules, team division), team training for preparation	The tournament is prepared with a clear and timely structure	Preparing and managing mini-tournaments	No tournament planning or team-based competition training	The tournament is prepared with a clear and timely structure

Individual and team performance evaluation	Collective evaluation of team and individual performance based on simulation results	Individual reflection	Individual and team performance evaluation	General evaluation without individual reflection	Individual reflection
Holding final tournament and awarding ceremony	Implementation of the final tournament between teams, awarding awards to the best team	The team can manage the tournament successfully and with sportsmanship.	Holding final tournament and awarding ceremony	No tournament or awards ceremony	The team can manage the tournament successfully and with sportsmanship

The study adhered to ethical standards set out in the Declaration of Helsinki, which emphasizes the importance of protecting participants' rights, welfare, and privacy. All participants were thoroughly informed of the study's purpose, procedures, potential risks, and benefits before participation. Written informed consent was obtained from parents or guardians, given the participants' ages ranging from 8-9 years. Efforts were made to maintain confidentiality and anonymity throughout the research process. Participants were assigned a unique identification code, and data were stored securely, with access limited to authorized parties only. In addition, interventions were designed to minimize physical and psychological risks based on ethical guidelines for conducting research involving children in educational settings.

Instrument

This study employs the Physical Activity Questionnaire for Children (PAQ-C) to measure the level of physical activity among students. PAQ-C is a questionnaire for children aged 8 to 14, consisting of 10 questions. This questionnaire assesses children's physical activity over the past 7 days, encompassing various aspects such as leisure-time physical activity, school activities, and weekend activities. Each item is rated on a scale from 1 to 5, with higher scores indicating greater physical activity levels. PAQ-C has been widely used and is recognized as a valid and reliable tool for measuring physical activity in children (Kowalski et al., 2004) For assessing students' motor skill competencies, the instruments used are derived from prior research and development focused on three main components: balance movements, locomotor movements, and manipulative movements. Each component is evaluated using a performance-based rubric developed in previous studies, categorized into five normative levels: excellent, good, adequate, insufficient, and very insufficient (Wibowo et al., 2024).

The motivation instrument in this research utilizes a sports motivation questionnaire designed to assess students' motivation levels in participating in PE classes. This questionnaire includes several dimensions of motivation, such as intrinsic motivation (driven from within) and extrinsic motivation (driven by external factors like rewards or recognition). Before its use, this questionnaire will undergo independent validity and reliability testing to ensure that each item accurately and consistently measures student motivation. The validity test will be conducted through item correlation methods, yielding a value of 0.71, while reliability will be assessed using Cronbach's Alpha for internal consistency, achieving a score of 0.78. The instrument can be seen in Table 2.

Table 2. Sports Motivation Instruments

Description
1. I enjoy participating in sports classes at school.
2. I feel more excited when learning sports with my friends.
3. I like performing various sports movements that the teacher has taught me.
4. I feel proud when I can execute complex movements in PE.
5. I have always wanted to attend PE classes because I feel happy.
6. I feel healthier after participating in PE classes.
7. My PE teacher always encourages me.
8. I enjoy running, jumping, and playing during PE classes.
9. I feel confident when participating in sports activities.
10. I want to exercise more often outside of school as wel

Data analysis

The data collected in this study were analyzed using descriptive and inferential statistical methods to provide a comprehensive understanding of the impact of the implemented intervention program. Descriptive statistics presented an overview of the mean scores and standard deviations for students' motivation, physical activity, and motor skills. Through this analysis, the profiles of students from both groups, i.e., the experimental group receiving SEM intervention and the control group receiving conventional intervention, can be described before and after the intervention. Before the inferential

analysis, a normality test with kolmogorov smirnov was conducted first. Inferential analysis was conducted using an Independent Sample t-test to determine significant differences between the experimental and control groups. This t-test was used to determine whether there was a significant difference in the mean values of the motivation variables, physical activity, and motor skills between the two groups of data processing using SPSS 25 software.

Results

This section presents the research findings derived from the data analysis regarding the impact of the Sport Management program based on the SEM in PE on students' motivation, physical activity, and motor skills in elementary schools. The data analysis compares the experimental group, which received the SEM based intervention, and the control group, which underwent conventional teaching methods.

Table 3. Prerequisite Test

Kolmogorov-Smirnov	Homogeneity
0,654	0,578

Based on the statistical test results in Table 3, the Kolmogorov-Smirnov value of 0.654 indicates that the research data meets the normality assumption, with $p > 0.05$. This suggests that the data is normally distributed. Furthermore, the homogeneity value of 0.578 indicates that the variance between groups in this study also meets the homogeneity assumption ($p > 0.05$). Therefore, it can be concluded that the variance between the experimental and control groups is uniform or not significantly different. Overall, both test results demonstrate that the data meets the fundamental assumptions for parametric tests, thus allowing for further statistical analysis methods.

Table 4. Group Statistics

Aspect	Group	N	Mean	Std. Deviation
Motivation	SEM	60	80.5	4.2
	Conventional Model	60	70.3	5.6
Physical activity	SEM	60	78.9	3.8
	Conventional Model	60	68.2	6.1
Motor skills	SEM	60	82.7	4.1
	Conventional Model	60	71.5	5.9

Based on the analysis results presented in Table 4, the group that received the intervention through the SEM achieved an average score of 80.5 with a standard deviation of 4.2, while the group undergoing the conventional model obtained an average score of only 70.3 with a standard deviation of 5.6. These results indicate that SEM not only enhances student motivation but also maintains consistency among students. In the physical activity variable, the SEM group also demonstrated superiority, with an average score of 78.9 and a standard deviation of 3.8, compared to the conventional group, which had an average physical activity score of 68.2 and a higher standard deviation of 6.1. This shows that implementing SEM significantly and consistently increases students' physical activity levels.

Regarding motor skills, the SEM group achieved the highest average score of 82.7 with a standard deviation of 4.1, significantly surpassing the conventional group, which obtained an average motor skills score of 71.5 with a standard deviation 5.9. The more consistent improvement in motor skills within the SEM group indicates that this approach significantly positively affects the development of stable basic physical skills among students. Overall, these results suggest that the SEM is more effective in enhancing students' motivation, physical activity, and motor skills than conventional pedagogical models.

The results of the descriptive analysis in Table 5 show that the SEM program significantly improved motivation, physical activity, and motor skills among the students compared to the conventional model. Regarding motivation, the SEM group had a pre-test average score of 60.5 ± 5.2, which increased to 75.7 ± 4.8 in the post-test. In contrast, the conventional group increased from 57.8 ± 6.1 in the pre-test to 60.3 ± 5.9 in the post-test. The more significant increase observed in the SEM group demonstrates that this sports education model is more effective in motivating students.

Table 5. Paired Sample Statistic

Aspect	Group	Pre-test (Mean ± SD)	Post-test (Mean ± SD)
Motivation	SEM	60.5 ± 5.2	75.7 ± 4.8
	Conventional Model	57.8 ± 6.1	60.3 ± 5.9
Physical activity	SEM	62.4 ± 4.7	78.9 ± 4.1
	Conventional Model	61.2 ± 5.5	69.8 ± 5.2
Motor skills	SEM	58.6 ± 5.3	74.6 ± 4.9
	Conventional Model	57.5 ± 6.0	69.7 ± 5.8

Regarding physical activity, the SEM group exhibited an average increase from 62.4 ± 4.7 in the pre-test to 78.9 ± 4.1 in the post-test. Meanwhile, the conventional group only increased from 61.2 ± 5.5 to 69.8 ± 5.2. The higher improvement in the SEM group indicates that this approach is more successful in enhancing student engagement in physical activities. In motor skills, the SEM group recorded an increase from 58.6 ± 5.3 in the pre-test to 74.6 ± 4.9 in the post-test. The conventional group also experienced an improvement, but only from 57.5 ± 6.0 to 69.7 ± 5.8. These results suggest that SEM enhances motivation and physical activity and effectively improves students' motor skills compared to conventional teaching methods. Overall, this data supports the effectiveness of the SEM in achieving more significant improvements across all three measured aspects of PE learning, highlighting the potential of SEM to deliver more optimal outcomes in the context of elementary school PE.

Discussion

This study aimed to explore the effectiveness of SEM implementation in increasing student motivation, physical activity, and motor skills in primary school students aged 8-9 years. This study aims to provide empirical insights into how a pedagogical model-based approach can create a more engaging and participatory learning experience compared to conventional PE models. This study hypothesized that applying SEM would significantly improve student motivation, physical activity, and motor skills compared to the conventional learning model. Concerning the results obtained, this discussion section analyzes the main findings in the context of the research objectives and provides an interpretation of the proposed hypotheses. This is done to explain the contribution of this study in strengthening the existing literature regarding the effectiveness of the SEM approach in PE at the primary school level.

The research findings indicate that student motivation is significantly higher in the group utilizing the SEM than in the conventional pedagogical models. This suggests that the SEM method can optimize student engagement and interest in PE. Several studies have demonstrated that SEM significantly enhances students' intrinsic motivation due to its participatory and team-based characteristics, which encourage active student involvement in the learning process (Llanos Muñoz et al., 2022). Another research also found that SEM facilitates the creation of a more inclusive and competitive learning environment, positively impacting student motivation as they feel a greater sense of ownership and responsibility in the learning process (Evelia Franco et al., 2021). These results are consistent with other studies that observe that SEM significantly enhances students' intrinsic motivation, mainly because this approach fosters a more dynamic learning atmosphere and emphasizes achieving common goals within PE (Cuevas et al., 2016). The results of the study, which showed a significant increase in motivation in the SEM group, contradict several studies that report that conventional learning approaches, when combined with targeted feedback and individual support, can also positively impact student motivation. (Aslam, 2021; H. Wang & Lehman, 2021).

The interaction between self-determined motivation levels and the SEM intervention is critical in understanding this approach's effectiveness. In PE, self-determined motivation, based on the Self-Determination Theory, emphasizes the importance of fundamental psychological needs such as autonomy, competence, and relatedness (Vasconcellos et al., 2020). The implementation of SEM provides opportunities for students to actively participate in decision-making, team management, and performance evaluation, which, in turn, can enhance their sense of autonomy and competence. This aligns findings, which indicate that pedagogical approaches that allow for student autonomy can significantly boost intrinsic motivation and student engagement in PE (De Meyer et al., 2016).

Moreover, the aspect of enjoyment in SEM is highly relevant, as enjoyment is one of the key factors influencing students' engagement in physical activities (El-Sherif, 2016; Martin, 2024). SEM, with its

healthy competitive elements such as tournaments and rewards, creates a learning experience that is both enjoyable and challenging. The focus on game-based activities and team collaboration within SEM enables students to experience a sense of enjoyment that fosters active participation. enjoyment in PE is positively correlated with motivation and sustained engagement in physical activities over the long term (Burns et al., 2022). Therefore, SEM supports the development of physical and social skills and creates a learning environment that nurtures self-determined motivation and enjoyment, both of which are essential elements for effective and sustainable learning in PE.

The research findings indicate that implementing the SEM significantly enhances students' physical activity compared to conventional models. SEM, designed to replicate the structure of actual sports activities, incorporates elements such as competition, team collaboration, and active student roles, which have been shown to effectively encourage optimal student physical engagement (Perlman, 2012). supports this finding, demonstrating that the SEM approach successfully increases students' physical activity levels by emphasizing their roles as active team members, enhancing their engagement in each learning session (Casado-Robles et al., 2020). Another study reveals that students participating in SEM-based learning tend to exhibit higher physical activity frequencies than those following conventional approaches, as this model provides greater motivation and responsibility to students in achieving shared goals (Sutisna et al., 2017).

The significant improvement in motor skills through the implementation of the SEM in this study underscores the advantages of this model in holistically developing students' physical abilities. SEM allows students to take active roles in an environment that simulates real sports competition, motivating them to enhance their motor skills naturally and continuously. SEM provides students with opportunities to learn through active roles as athletes and coaches, encouraging them to practice motor skills with greater intensity and motivation (Manninen & Campbell, 2022b). These findings align with the research which demonstrates that the SEM approach effectively develops students' motor skills due to the presence of structure, rules, and strategies in the learning process, making students more motivated and focused on mastering movements (Evangelio Caballero et al., 2018)

Implementing the SEM not only facilitates more effective achievement of PE goals but also significantly enhances the quality of social interactions among students. In PE, positive social interaction is essential as it strengthens students' collaboration, empathy, and leadership skills. SEM encourages students to collaborate in teams and understand their roles in game situations that resemble actual conditions, thereby enhancing their social and communication skills (B. Wang & Chen, 2021). Similarly, research indicates that sports education supports the development of students' interpersonal relationships through activities that promote interaction in a positive and educational context (Opstoel et al., 2020). engagement in sports activities can encourage individuals to be actively involved and engage positively within the realm of social interactions (Flores Rivera et al., 2021).

The limitations of this study encompass several aspects that need to be considered. This research involved students from only one elementary school, which may restrict the generalization of findings to a broader population. Variations in environmental context, culture, and student characteristics in other schools or regions may yield different results. More than the duration of the SEM intervention, lasting 8 weeks, may be required to observe more profound changes in long-term motivation, physical activity, and motor skills. Additionally, this study relied on measurements obtained through questionnaires, which require accurate understanding and honesty from student respondents; limitations of subjectivity or bias may influence these factors in their answers. These limitations are anticipated to serve as a foundation for future research to expand participant scope, intervention duration, and the use of more diverse measurement methods or a combination of qualitative and quantitative approaches to strengthen the validity of the results.

Conclusions

Based on the results and discussion of the study, implementing the SEM in PE demonstrates significant effectiveness in enhancing motivation, physical activity, and motor skills among elementary school students compared to conventional pedagogical models. Students in the experimental group exhibited more significant improvements in all three aspects, indicating that SEM can create a more supportive,

participative, and student-centered learning environment. Overall, this study suggests that SEM, as a sports management program in PE, can be a relevant innovation within the elementary school curriculum to optimize students' physical development and learning motivation. However, the successful implementation of SEM requires an appropriate learning environment and teachers' active role to ensure the optimal achievement of educational objectives.

Acknowledgements

We sincerely thank all those who have helped and supported this research. Thank you to the research team, students, and all collaborators who have given dedication, time, and valuable contributions to the research process. We are also grateful to the reviewers, experts, and other parties who have provided valuable input and suggestions to improve the quality of this research.

Financing

We want to thank Satya Wacana Christian University for funding this research grant. The support provided is significant in developing and carrying out this research so that we can produce valuable findings for the development of physical education at the elementary school level. Thank you for the university's trust and commitment to supporting research activities that positively impact academic and community development.

References

Aslam, R. (2021). Impact of Learning Motivation on Students' Academic Achievement: Mediating Role of Constructive Feedback. *Pakistan Social Sciences Review*, *5*(III), 472–484. https://doi.org/10.35484/pssr.2021(5-III)35

Bayu, W. I., Nurhasan, N., Suroto, S., & Solahuddin, S. (2022). Peer observation, self-assessment, and circuit learning: improving critical thinking and physical fitness in physical education. *Jurnal Cakrawala Pendidikan*, *41*(2), 308–320. https://doi.org/10.21831/cp.v41i2.38654

Bidzan-Bluma, I., & Lipowska, M. (2018). Physical Activity and Cognitive Functioning of Children: A Systematic Review. *International Journal of Environmental Research and Public Health*, *15*(4), 800. https://doi.org/10.3390/ijerph15040800

Bulten, R., Bedard, C., Graham, J. D., & Cairney, J. (2022). Effect of cognitively engaging physical activity on executive functions in children. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.841192

Burns, R. D., Bai, Y., Podlog, L. W., Brusseau, T. A., & Welk, G. J. (2022). Associations of Physical Activity Enjoyment and Physical Education Enjoyment With Segmented Daily Physical Activity in Children: Exploring Tenets of the Trans-Contextual Model of Motivation. *Journal of Teaching in Physical Education*, 1–5. https://doi.org/10.1123/jtpe.2021-0263

Carranza-Bautista, D. (2021). Gestión del deporte o la actividad física: modelo de intervención global (Sports or physical activity management: global intervention model). *Retos*, *39*, 961–972. https://doi.org/10.47197/retos.v0i39.80303

Casado-Robles, C., Mayorga-Vega, D., Guijarro-Romero, S., & Viciana, J. (2020). ¿Es efectivo el Modelo de Educación Deportiva para mejorar la deportividad y actividad física en escolares? [Is the Sport Education Model effective in improving sportsmanship and physical activity in students?]. *RICYDE. Revista Internacional de Ciencias Del Deporte*, *16*(60), 180–198. https://doi.org/10.5232/ricyde2020.06005

Choi, S. M., Sum, K. W. R., Leung, F. L. E., Wallhead, T., Morgan, K., Milton, D., Ha, S. C. A., & Sit, H. P. C. (2021). Effect of sport education on students' perceived physical literacy, motivation, and physical activity levels in university required physical education: a cluster-randomized trial. *Higher Education*, *81*(6), 1137–1155. https://doi.org/10.1007/s10734-020-00603-5

Cuevas, R., García-López, L. M., & Serra-Olivares, J. (2016). Sport education model and self-determination theory. *Kinesiology*, *48*(1), 30–38. https://doi.org/10.26582/k.48.1.15

Dapp, L. C., Gashaj, V., & Roebers, C. M. (2021a). Physical activity and motor skills in children: A differentiated approach. *Psychology of Sport and Exercise*, *54*, 101916. https://doi.org/10.1016/j.psychsport.2021.101916

Dapp, L. C., Gashaj, V., & Roebers, C. M. (2021b). Physical activity and motor skills in children: A differentiated approach. *Psychology of Sport and Exercise*, *54*, 101916. https://doi.org/10.1016/j.psychsport.2021.101916

De Meyer, J., Soenens, B., Vansteenkiste, M., Aelterman, N., Van Petegem, S., & Haerens, L. (2016). Do students with different motives for physical education respond differently to autonomy-supportive and controlling teaching? *Psychology of Sport and Exercise*, *22*, 72–82. https://doi.org/10.1016/j.psychsport.2015.06.001

Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., Lambourne, K., & Szabo-Reed, A. N. (2016). Physical Activity, Fitness, Cognitive Function, and Academic Achievement in Children. *Medicine & Science in Sports & Exercise*, *48*(6), 1197–1222. https://doi.org/10.1249/MSS.0000000000000901

El-Sherif, J. L. (2016). The Value of Fun in Physical Activity. *Strategies*, *29*(2), 3–8. https://doi.org/10.1080/08924562.2015.1133353

Evangelio Caballero, C., Sierra-Díaz, M. J., González-Víllora, S., & Fernández-Rio, F. J. (2018). The sport education model in elemtary and secondary education: A systematic review. *Movimento (ESEFID/UFRGS)*, *24*(3), 931. https://doi.org/10.22456/1982-8918.81689

Evelia Franco, Carlota Tova, Alba González-Peño, & J. Coterón. (2021). *Effects of a Sport Education Model-Based Teaching Intervention on Students' Behavioral and Motivational Outcomes within the Physical Education Setting in the COVID-19 Scenario*. *13*.

Firth, J., Rosenbaum, S., Stubbs, B., Gorczynski, P., Yung, A. R., & Vancampfort, D. (2016). Motivating factors and barriers towards exercise in severe mental illness: a systematic review and meta-analysis. *Psychological Medicine*, *46*(14), 2869–2881. https://doi.org/10.1017/S0033291716001732

Flores Rivera, C., Luna Villouta, P., Fuentealba Urra, S., Garrido Méndez, A., Muñoz Sabando, G., & Torres Esparza, A. (2021). Significados atribuidos a la práctica de actividad física, ejercicio físico y deporte como medio de configuración de redes sociales y participación ciudadana (Meanings attributed to the practice of physical activity, physical exercise and sport as a mean. *Retos*, *42*, 831–840. https://doi.org/10.47197/retos.v42i0.65967

Gråstén, A., & Watt, A. (2017). A Motivational Model of Physical Education and Links to Enjoyment, Knowledge, Performance, Total Physical Activity and Body Mass Index. *Journal of Sports Science & Medicine*, *16*(3), 318–327.

Handley, M. A., Lyles, C. R., McCulloch, C. E., & Cattamanchi, A. (2018). Selecting and Improving Quasi-Experimental Designs in Effectiveness and Implementation Research. *Annual Review of Public Health*, *39*, 5–25. https://api.semanticscholar.org/CorpusID:4619715

Kao, C.-C. (2019). Development of Team Cohesion and Sustained Collaboration Skills with the Sport Education Model. *Sustainability*, *11*(8), 2348. https://doi.org/10.3390/su11082348

Kowalski, K. C., Crocker, P. R. E., Donen, R. M., & Honours, B. (2004). *The Physical Activity Questionnaire for Older Children (PAQ-C) and Adolescents (PAQ-A) Manual*.

Latino, F., & Tafuri, F. (2023). Physical Activity and Academic Performance in School-Age Children: A Systematic Review. *Sustainability*, *15*(8), 6616. https://doi.org/10.3390/su15086616

Leyton-Román, M., Núñez, J. L., & Jiménez-Castuera, R. (2020). The Importance of Supporting Student Autonomy in Physical Education Classes to Improve Intention to Be Physically Active. *Sustainability*, *12*(10), 4251. https://doi.org/10.3390/su12104251

Li, Y., Song, H., Chang, J., & Yang, M. (2019). The Effect of Extracurricular Coordinated Physical Education on the Development of Basic Motor Skills of Children aged 7-9 Years Old. *Medicine & Science in Sports & Exercise*, *51*(6S), 512–512. https://doi.org/10.1249/01.mss.0000562038.20597.2b

Llanos Muñoz, R., Leo Marcos, F. M., López Gajardo, M. Á., Cano Cañada, E., & Sánchez Oliva, D. (2022). ¿Puede el Modelo de Educación Deportiva favorecer la igualdad de género, los procesos motivacionales y la implicación del alumnado en Educación Física? (Can the Sport Education Model promote gender equality, motivational processes and student engagement in Physical Education?). *Retos*, *46*, 8–17. https://doi.org/10.47197/retos.v46.92812

Manninen, M., & Campbell, S. (2022a). The effect of the Sport Education Model on basic needs, intrinsic motivation and prosocial attitudes: A systematic review and multilevel meta-analysis. *European Physical Education Review*, *28*(1), 78–99. https://doi.org/10.1177/1356336X211017938

Manninen, M., & Campbell, S. (2022b). The effect of the Sport Education Model on basic needs, intrinsic motivation and prosocial attitudes: A systematic review and multilevel meta-analysis. *European Physical Education Review*, *28*(1), 78–99. https://doi.org/10.1177/1356336X211017938

Martin, R. (2024). Pupil Voices: Review of Factors Influencing Pupil Participation in Primary School Physical Activity. *Translational Journal of the American College of Sports Medicine*, *9*(2). https://doi.org/10.1249/TJX.0000000000000260

Mayorga-Vega, D., Montoro-Escaño, J., Guijarro-Romero, S., & Viciana, J. (2019). ¿El nivel basal de motivación autodeterminada hacia la Educación Física influye en la mejora de la resistencia cardiorrespiratoria? Un estudio de intervención controlado (Does baseline self-determined motivation toward Physical Education influence cardio. *Retos*, *37*, 344–350. https://doi.org/10.47197/retos.v37i37.71662

Méndez-Giménez, A., del Pilar Mahedero-Navarrete, M., Puente-Maxera, F., & de Ojeda, D. M. (2022). Effects of the Sport Education model on adolescents' motivational, emotional, and well-being dimensions during a school year. *European Physical Education Review*, *28*(2), 380–396. https://doi.org/10.1177/1356336X211047866

Montoya, A., Simonton, K., & Gaudreault, K. L. (2020). Enhance Student Motivation and Social Skills: Adopting the Sport Education and Cooperative Learning Models. *Journal of Physical Education, Recreation & Dance*, *91*(8), 15–20. https://doi.org/10.1080/07303084.2020.1798307

Opstoel, K., Chapelle, L., Prins, F. J., De Meester, A., Haerens, L., van Tartwijk, J., & De Martelaer, K. (2020). Personal and social development in physical education and sports: A review study. *European Physical Education Review*, *26*(4), 797–813. https://doi.org/10.1177/1356336X19882054

Perlman, D. (2012). The influence of the Sport Education Model on amotivated students' in-class physical activity. *European Physical Education Review*, *18*(3), 335–345. https://doi.org/10.1177/1356336X12450795

Schiff, N. T., & Supriady, A. (2023). Sports education model (SEM) on students' motivation and physical activity in classroom: A literature review. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*, *9*(1), 40–58. https://doi.org/10.29407/js_unpgri.v9i1.19067

Sutisna, N., Suherman, A., Ma'mun, A., & Mulyana, M. (2017). The Effect of Sport Education Model (SEM) and Conventional Learning Model on the Active Learning Time. *2nd International Conference on Sports Science, Health and Physical Education*, 277–279. https://doi.org/10.5220/0007059702770279

Tendinha, R., Alves, M. D., Freitas, T., Appleton, G., Gonçalves, L., Ihle, A., Gouveia, É. R., & Marques, A. (2021a). Impact of Sports Education Model in Physical Education on Students' Motivation: A Systematic Review. *Children*, *8*(7), 588. https://doi.org/10.3390/children8070588

Tendinha, R., Alves, M. D., Freitas, T., Appleton, G., Gonçalves, L., Ihle, A., Gouveia, É. R., & Marques, A. (2021b). Impact of Sports Education Model in Physical Education on Students' Motivation: A Systematic Review. *Children*, *8*(7), 588. https://doi.org/10.3390/children8070588

Vasconcellos, D., Parker, P. D., Hilland, T., Cinelli, R., Owen, K. B., Kapsal, N., Lee, J., Antczak, D., Ntoumanis, N., Ryan, R. M., & Lonsdale, C. (2020). Self-determination theory applied to physical education: A systematic review and meta-analysis. *Journal of Educational Psychology*, *112*(7), 1444–1469. https://doi.org/10.1037/edu0000420

Wang, B., & Chen, S. (2021). Sport Education for Social Competence in K-12 Physical Education. *Quest*, *73*(4), 391–409. https://doi.org/10.1080/00336297.2021.1986410

Wang, H., & Lehman, J. D. (2021). Using achievement goal-based personalized motivational feedback to enhance online learning. *Educational Technology Research and Development*, *69*(2), 553–581. https://doi.org/10.1007/s11423-021-09940-3

White, H., & Sabarwal, S. (2014). *Quasi-Experimental Design and Methods*. www.unicef-irc.org

Wibowo, C., Christovel Dese, D., & Eko Nopiyanto, Y. (2024). Developing a precise gross motor skills assessment instrument for elementary school students (ages 7-9). *Pedagogy of Physical Culture and Sports*, *28*(2), 84–92. https://doi.org/10.15561/26649837.2024.0201

Zhang, J., Xiao, W., Soh, K. G., Yao, G., Anuar, M. A. B. M., Bai, X., & Bao, L. (2024). The effect of the Sport Education Model in physical education on student learning attitude: a systematic review. *BMC Public Health*, *24*(1), 949. https://doi.org/10.1186/s12889-024-18243-0

Authors' and translators' details:

Dennys Christovel Dese	dennys.christovel@uksw.edu	Author
Cahyo Wibowo	cahyo.wibowo@uksw.edu	Author
Priska Lydia Sulistyawati Pulungan	priska.pulungan@uksw.edu	Translator