

The Effect of the Sport Education Model on Elementary Students' Interpersonal Intelligence in Volleyball Instruction

By Faiz Faozi



The Effect of the Sport Education Model on Elementary Students' Interpersonal Intelligence in Volleyball Instruction

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Abstract

Study purpose. Contemporary education emphasizes holistic student development, including social and emotional competencies such as interpersonal intelligence. However, research on integrating Social and Emotional Learning (SEL) into physical education through structured pedagogical models remains limited, particularly in non-Western educational contexts like Indonesia. Objectives: This study aims to analyze the effect of implementing the Sport Education Model (SEM) on enhancing the interpersonal intelligence of elementary school students within volleyball instruction.

Materials and methods. A true experimental design with a pretest-posttest control group structure was employed. The sample consisted of 64 fifth-grade students from SDN Cidadap 3, divided into an experimental group (n=32) taught using SEM and a control group (n=32) taught using conventional direct instruction. Data were collected using a validated interpersonal intelligence questionnaire and analyzed statistically using paired sample t-tests.

Results. The results indicated that both groups showed significant improvement in interpersonal intelligence scores. However, the improvement in the experimental group (+16 points) was substantially greater than that in the control group (+4 points).

Conclusions. These findings suggest that SEM is significantly more effective in developing students' interpersonal competencies such as empathy, communication, cooperation, and social skills compared to the conventional approach. Implications: Theoretically, this study contributes to the literature on pedagogical models in physical education by demonstrating SEM's potential as a framework for integrating SEL into sport instruction. Practically, the findings encourage physical education teachers to adopt SEM to foster students'

interpersonal intelligence, particularly in elementary school settings where social-emotional development is critical. Policymakers and curriculum developers should consider supporting SEM implementation through professional development and resources to maximize physical education's role in holistic student development.

Keywords: Sport Education Model, interpersonal intelligence, physical education, volleyball, elementary school, social-emotional learning.

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Introduction

Contemporary education has undergone a significant paradigm shift, moving beyond a narrow focus on academic achievement to embrace the holistic development of students. This shift recognizes the critical importance of fostering social and emotional competencies alongside cognitive skills (Palamar et al., 2024). Social and Emotional Learning (SEL) has emerged as a foundational framework in this endeavor, with extensive meta-analytic evidence demonstrating its positive effects on students' psychological well-being, behavioral adjustment, academic performance, and long-term life outcomes (Ha et al., 2025). SEL programs are designed to cultivate core competencies, including self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (Prakash et al., 2025). These competencies are intrinsically linked to interpersonal intelligence, the capacity to accurately perceive, understand, and respond effectively to the emotions, motivations, and desires of others, which is a cornerstone for building empathy, cooperation, and healthy social relationships.

Within the school curriculum, Physical Education (PE) is uniquely positioned as a pedagogical domain to advance these SEL objectives authentically and experientially (Faozi et al., 2024). Unlike many classroom-based subjects, PE, particularly through team sports, provides a dynamic, interactive, and inherently social context where interpersonal skills are constantly engaged, practiced, and refined. Team sports necessitate coordinated action, strategic communication, shared mental models, and collective problem-solving processes fundamentally rooted in team cognition (Blaser & Seiler, 2019). Neuroscientific evidence further corroborates this link, indicating that cooperative team-sport training enhances interpersonal neural synchronization, a biological correlate of effective collaboration (Li et al., 2020). Empirical studies consistently associate participation in collective sports with heightened levels of emotional and social intelligence (Pinelo-Trancoso & Ardura, 2023). This positions structured physical education not merely as a venue for physical conditioning but as a powerful vehicle for explicit and implicit SEL instruction (Barney et al., 2021).

However, the realization of this significant potential is not automatic; it is profoundly mediated by the instructional model and pedagogical approach employed. Traditional, teacher-centered pedagogical approaches in PE, which often prioritize direct instruction, repetitive skill drills, and a performance-oriented climate, can limit opportunities for meaningful peer interaction, collaborative problem-solving, and shared leadership (Hortigüela et al., 2016). Such environments may inadvertently stifle the very social engagement and affective learning necessary for interpersonal growth (Sgrò et al., 2020). In contrast, contemporary, student-centered pedagogical models are explicitly designed to create rich social-learning ecosystems that align with the principles of effective SEL (Fernandez-Rio et al., 2025; Resifa et al., 2025).

The Sport Education Model (SEM), pioneered by Siedentop, is one such model specifically engineered to provide an authentic, holistic, and educationally rich sport experience within school settings (Bessa et al., 2019). Its core structural features including persistent team

affiliation, student role-taking (e.g., coach, captain, statistician), formal competition within a festive and inclusive context, and culminating events systematically create the conditions for developing key SEL competencies. These structures foster positive interdependence and individual accountability, two critical conditions for effective collaborative learning, aligning with cooperative learning principles in which face-to-face interaction and positive interdependence are essential (Boke et al., 2025). By embedding students in roles that require leadership, mutual responsibility, negotiation, and collective goal pursuit, SEM directly operationalizes the development of relationship skills and social awareness core facets of interpersonal intelligence (Wang & Chen, 2021).

Despite robust international evidence on the benefits of SEL and the efficacy of pedagogical models like SEM, significant research gaps persist, particularly in non-Western educational contexts. First, while studies in Western nations abound, there is a noted scarcity of empirical research focusing on the integration of SEL and innovative pedagogical models in non-Western, Global South nations, especially concerning metacognition and self-regulated learning (Prakash et al., 2025). Second, within the Indonesian context a nation with a rich cultural emphasis on community and harmony (*gotong royong*) research on implementing and measuring the impact of structured, student-centered models like SEM on specific SEL outcomes is extremely limited (Alifuddin & Widodo, 2022). Third, while the benefits of sports for emotional intelligence are documented, more research is needed to isolate and quantify the specific impact of SEM on discrete constructs like interpersonal intelligence within elementary education, a critical period for social-emotional development (Sindiani et al., 2025).

To address these gaps, this study investigates the effect of the Sport Education Model on the interpersonal intelligence of elementary school students during volleyball instruction in Indonesia. Using a true-experimental design, it directly compares outcomes from SEM against a conventional, teacher-directed approach. The findings aim to contribute to the growing global literature on effective, culturally responsive SEL integration (Arikan, 2020) and provide locally relevant, evidence-based guidance for educators and policymakers seeking to harness the transformative potential of physical education for the holistic development of students.

Materials and methods

Study participants

The participants were 64 fifth-grade students from SDN Cidadap 3. A cluster random sampling technique was used, where existing classes were randomly selected and assigned as clusters to either the experimental or control condition (Hasan Lubis, 2025). This resulted in two groups: the experimental group (n=32) and the control group (n=32). This approach maintains the natural classroom setting while ensuring random assignment to minimize selection bias.

Experimental Group. This group received volleyball instruction using the Sport Education Model (SEM) over a predetermined period. The SEM intervention was structured into seasons, featuring key elements such as team affiliation, role assignment (e.g., coach, captain, recorder), formal competition within a festive context, and culminating events. The teacher acted as a facilitator, guiding students through active learning, collaborative tasks, and shared responsibility for team management and learning.

Control Group. This group received instruction on the same volleyball material using a conventional, teacher-centered model (Direct Instruction). In this model, the teacher served as the primary source of information, demonstrating skills and directing practice. Student engagement was predominantly passive, focusing on repetition and individual skill execution with minimal structured peer interaction or collaborative problem-solving.

Study organization

This study employed a true experimental design with a randomized pretest-posttest control group structure. The design was selected to rigorously evaluate the causal effect of the Sport Education Model (SEM) on students' interpersonal intelligence by comparing it against a conventional teaching model under controlled conditions. A Randomized Control Group Pretest-Posttest Design was implemented. This involved randomly assigning intact classes to either an experimental group or a control group. Both groups were assessed before (pretest) and after (posttest) the instructional intervention. The primary instrument for data collection was a validated interpersonal intelligence questionnaire. This Likert-scale questionnaire was designed to measure key dimensions such as empathy, effective communication, social relationship building, and cooperative skills within the context of physical education and team sports. The questionnaire was administered as a pretest before the intervention began and as a posttest after its completion.

Statistical analysis

Data analysis followed a systematic sequence. Descriptive Statistics: Means, standard deviations, and score ranges were calculated for both groups' pretest and posttest results to provide an overview of the data. Assumption Tests: The Shapiro-Wilk test was used to assess the normality of data distribution, and Levene's test was employed to examine the homogeneity of variances between groups. These tests confirmed that the data met the necessary parametric assumptions. Inferential Statistics: A paired-sample t-test was conducted within each group to compare pretest and posttest scores and determine the significance of any change. This analysis was performed separately for the experimental and control groups to isolate the effect of each teaching model.

Results

The data collected from the pretest and posttest interpersonal intelligence questionnaires were analyzed to determine the effect of the Sport Education Model (SEM). The findings are presented descriptively and inferentially below.

Descriptive Statistics

The pretest and posttest scores for both the experimental and control groups are summarized in Table 1.

Table 1. Descriptive Statistics of Pretest and Posttest Scores for Experimental and Control Groups

Group	Test	N	Sum Score	Mean	Std. Deviation	Max Score	Min Score
Experimental	Pretest	32	2255	70	5	78	61
	Posttest	32	2739	86	5	94	76
Control	Pretest	32	2226	70	4	78	61
	Posttest	32	2364	74	5	81	65

As shown in Table 1, the experimental group's mean score increased from 70 (pretest) to 86 (posttest), indicating a notable gain. The control group showed a smaller increase, from a mean of 70 to 74.

Tests of Assumptions

Prior to hypothesis testing, statistical assumptions were verified. Normality Test: The Shapiro-Wilk test was conducted. Results indicated that the data for both groups at pretest and posttest were normally distributed ($p > 0.05$), as detailed in Table 2. Homogeneity of Variance Test: Levene's test confirmed that the variances between the pretest and posttest scores were homogeneous ($F = 0.399, p = 0.754$).

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 Table 2. Results of Normality Test (Shapiro-Wilk)

Group	Test	Shapiro-Wilk Statistic	p-value
Experimental	Pretest	0.940	0.073
	Posttest	0.951	0.156
Control	Pretest	0.935	0.055
	Posttest	0.944	0.095

Note: $p > .05$ indicates normal distribution.

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Inferential Statistics: Paired Sample T-Test

A paired sample t-test was conducted for each group to determine if the difference between pretest and posttest scores was statistically significant. The results are presented in Table 3.

Table 3. Results of Paired Sample T-Test for Interpersonal Intelligence Scores

Group	Mean Difference (Post-Pre)	t-value	df	p-value
Experimental	+16	-47.884	31	<.001
Control	+4	-12.603	31	<.001

The analysis revealed a statistically significant increase in interpersonal intelligence scores for both the experimental group ($t(31) = -47.884, p < .001$) and the control group ($t(31) = -12.603, p < .001$). However, the magnitude of the mean difference was substantially larger in the experimental group (+16 points) compared to the control group (+4 points). This indicates that while both groups improved, the improvement associated with the Sport Education Model was markedly greater.

Discussion

This study provides empirical evidence that implementing the Sport Education Model (SEM) in elementary school volleyball instruction significantly enhances students' interpersonal intelligence compared to a conventional, teacher-centered approach. The substantial mean difference in post-test scores (+16 points for the experimental SEM group versus +4 points for the control group) underscores the model's efficacy as a pedagogical strategy for fostering key social-emotional competencies. This finding aligns with the foundational purpose of SEM, which is designed to deliver authentic, holistic sport experiences that extend beyond mere skill execution to encompass social roles, teamwork, and shared responsibility (Bessa Pereira et al., 2019). The discussion that follows interprets these results within the broader theoretical and practical landscape of pedagogical models, Social and Emotional Learning (SEL), and collaborative education.

The superior outcomes associated with SEM can be attributed to its inherent structural components that actively cultivate the social environment necessary for interpersonal growth. Unlike conventional direct instruction, which often positions students as passive recipients in a teacher-dominated climate (Treve, 2024), SEM is fundamentally student-centered. It creates a "learning-focused climate" (Marcelino, 2025) through sustained team affiliation, role differentiation (e.g., coach, referee, statistician), and collaborative goal-setting. These structures foster positive interdependence and individual accountability two critical conditions

for effective collaborative learning (Zhou & Colomer, 2024). By assigning students meaningful responsibilities within their teams, such as acting as coach, referee, or scorekeeper, SEM fosters constant communication, negotiation, and mutual support, thereby effectively enhancing students' social information processing, empathy, and social skills (Siddagoud & Sindhe, 2024). This experiential, role-based learning is consistent with findings that collaborative projects in physical education significantly improve students' social skills and peer relationships (Luptáková & Antala, 2017). Furthermore, SEM's emphasis on formal competition within a festive framework channels innate motivational drives towards cooperative ends. The model strategically balances competition with cooperation, a factor identified by Wang & Chen (2021) as essential for nurturing social competence in SEM-based physical education. Students learn that team success depends not on individual prowess alone but on effective collaboration, strategic planning, and collective effort. This process enhances *psychological safety* and *inclusive* team dynamics (Boyd et al., 2024), allowing students to engage in face-to-face interaction and develop both technical and interpersonal skills (Mercier et al., 2023). The significant improvement in interpersonal intelligence observed in this study likely stems from this rich, authentic context where communication, empathy, and conflict resolution are not abstract concepts but necessary tools for achieving shared, meaningful objectives (Dese & Wibowo, 2025). This aligns with neurocognitive research suggesting team-sport training enhances the neural correlates of cooperative behavior (Li et al., 2020).

Conversely, the modest gain in the control group, while statistically significant, reflects the limitations of teacher-centered, practice-based approaches. Conventional pedagogy often prioritizes the reproduction of technical skills in a decontextualized manner, which can foster a performance-oriented climate focused on winning and comparison (Sgrò et al., 2020). While such methods may improve specific motor skills, they provide fewer structured opportunities for the sustained social interaction and shared decision-making required for deep interpersonal development (Rivas & Mateos, 2016). The control group's minimal improvement suggests that without intentional pedagogical design to promote collaboration, the social benefits of physical activity may remain incidental and underdeveloped.

The implications of this study extend beyond physical education into the broader educational imperative of integrating SEL. Interpersonal intelligence is a core component of emotional intelligence and is strongly linked to academic achievement, positive peer relationships, and overall adjustment (Martí et al., 2022). By demonstrating that a well-defined pedagogical model like SEM can effectively target this competency, our findings support the call for using physical education as a deliberate and powerful venue for SEL (Cipriano et al., 2023). SEM serves as a "design specification" (Bessa et al., 2019) for creating curricula that systematically develop students into more competent, literate, and enthusiastic participants not only in sports but in social life.

Conclusions

The present study strengthens the evidence base for the Sport Education Model as a transformative pedagogy in physical education. By moving beyond a focus solely on physical performance to intentionally engineer a collaborative, student-centered, and role-rich learning environment, SEM proves to be a highly effective strategy for developing the interpersonal intelligence crucial for students' holistic development.

6 The implications of this research are both theoretical and practical. Theoretically, the findings contribute to the growing body of literature on pedagogical models in physical education by demonstrating that SEM can serve as an effective framework for integrating Social and Emotional Learning (SEL) into sport instruction. Practically, the results suggest that physical education teachers should consider implementing SEM to foster students' interpersonal competencies, including empathy, communication, and cooperation. For

elementary school contexts, where social-emotional development is particularly critical, adopting SEM in team sports instruction can create meaningful opportunities for students to practice and refine these essential life skills. School administrators and curriculum developers are encouraged to provide professional development and resources to support teachers in implementing SEM effectively. Furthermore, policymakers should recognize physical education not merely as a venue for physical activity, but as a strategic platform for holistic student development through evidence-based pedagogical approaches like the Sport Education Model. 4

Educators are encouraged to adopt and adapt this model, with institutional support for training and resources (Giménez-Meseguer et al., 2022), to harness the full potential of physical education as a cornerstone of social-emotional learning.

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Conflict of interest

The authors have no conflict of interest to declare.

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