

Life Skills Development Through A Traditional Game-based Sport Education Model In Elementary School Physical Education

Heri Yusuf Muslihin^{1*}, Lutfi Nur¹, Rusani Jaelani¹, Purwati¹, M.E. Winarno², Andhega Wijaya³, Herdiansyah⁴, Wulan Nurlaela⁴, Fariha Nilan⁵

¹Department of Elementary School Teacher Education, Universitas Pendidikan Indonesia, Tasikmalaya, Indonesia

²Department of Physical Education, Health and Recreation, Universitas Negeri Malang, Malang, Indonesia

³Department of Physical Education, Health and Recreation, Universitas Negeri Surabaya, Surabaya, Indonesia

⁴Department of Physical Education, Universitas Cipasung Tasikmalaya, Tasikmalaya, Indonesia

⁵Department of Physical Education, Universitas Siliwangi, Tasikmalaya, Indonesia

*Corresponding Author: heriyusuf@upi.edu

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ABSTRACT:

This study investigated the effectiveness of a 16-session traditional game-based Sport Education Model intervention (SEM-TG) on the life skills of Grade 5 elementary school students in West Java, Indonesia. Using a quasi-experimental two-group pretest-posttest design and the Life Skills Scale for Sport (LSSS) as the outcome measure, 60 students were allocated to an Experimental Group (EG; n = 30) that received the SEM-TG intervention and a Control Group (CG; n = 30) that continued with the standard PE curriculum. The EG demonstrated a statistically significant and large-effect improvement in total LSSS scores from pre-test to post-test ($Z = -6.099$, $p < .001$, $r = .79$), whereas the CG showed no significant change ($p = .071$). Between-group comparison at post-test confirmed that the EG scored significantly higher than the CG ($U = 189.00$, $p < .001$, $r = .58$). Significant improvements were observed across all eight LSSS dimensions in the EG (all $p < .001$). The findings demonstrate that SEM integrated with Indonesian permanent traditional constitutes an effective and culturally grounded pedagogical approach for the intentional development of life skills in elementary school Physical Education.

Keywords: Life Skills, Traditional Games, Physical Education, Elementary School, Sport Education Model.

Introduction

The pace of globalization and digital transformation has changed the way children learn, play, and form social relationships. Technology has improved access to information

but has also reduced opportunities for direct interpersonal interaction, accelerated the erosion of indigenous cultural traditions, and contributed to lower levels of physical activity among children (Yemini et al., 2018). The pattern is well

documented in Indonesia. The national Sports Development Index between 2021 and 2023 showed declines in physical literacy (0.591 to 0.573), sports participation (0.286 to 0.254), and physical fitness (0.203 to 0.179) (Kemenpora, 2023). These trends are particularly concerning at the elementary level, where this developmental stage is critical for laying the groundwork for movement competence and socioemotional development (Baharuddin et al., 2026; Herdiansyah et al., 2025). Physical Education (PE) at this level is the primary educational platform for promoting active lifestyles and preparing children for the demands of adulthood (Albright & Wintle, 2022; Dudley et al., 2022). In addition, the reinforcement of Indonesian cultural values and the establishment of transferable life competencies have increasingly become the main objectives of the national education agenda (Risdiyana et al., 2021).

Life skills are defined as behavioral, cognitive, interpersonal, and intrapersonal competencies that enable individuals to deal with the demands of everyday life (T. J. Newman & Anderson-Butcher, 2021; Pierce et al., 2017). PE is strategically embedded in the school curriculum to develop these competencies (Williams et al., 2022). However, it is often assumed in the sports domain that life skills are developed automatically through participation in physical activity and that deliberate educational design is unnecessary (Gould & Carson, 2008; T. Newman et al., 2023). There is no evidence for this assumption. Research has consistently demonstrated that life-skills development requires well-structured, theoretically based programs that explicitly focus on specific competencies and systematically facilitate their transfer beyond the sporting context (Kendellen et al., 2017; Pierce et al., 2022). The core scientific problem motivating this study is precisely this distinction between incidental acquisition and deliberate life-skills instruction.

The literature consistently identifies three conditions as necessary for PE to promote transferable life skills. First, learning activities need to be organized around clear life-skills objectives (Bean & Forneris, 2016). Second,

instructors should have the knowledge and pedagogical competence to intentionally facilitate life-skills learning (Camiré et al., 2020). Third, sessions should blend sport experiences with daily life through structured reflection and guided debriefing (Turnnidge et al., 2014). A systematic review by (Triansyah, 2025) differentiates between implicit programs that rely on spontaneous transfer and explicit programs that include reflective discussion, role assignment, and debriefing as key instructional components, finding that only explicit programs generate reliable life-skills outcomes in Indonesian PE contexts. Similarly, Camiré et al. (2020) showed that sport-based positive youth development programs produce stronger life-skills outcomes when coaches and teachers actively facilitate structured reflection after each session.

One of the most researched instructional models in school PE is the Sport Education Model (SEM), originally developed by (Siedentop & Van der Mars, 2022). Its six characteristics, namely seasonality, team identity, formal competition, record-keeping, festivity, and culminating event, replicate a true sports season in a learning environment. Recent meta-analyses and systematic reviews have confirmed that SEM reliably improves student motivation, cooperative behavior, and positive social attitudes in diverse educational contexts (Méndez-Giménez et al., 2015; Zhang, Xiao, et al., 2024). A multilevel meta-analysis by Manninen & Campbell (2022) further confirmed that SEM outperforms traditional instructional styles in promoting basic psychological need satisfaction, intrinsic motivation, and prosocial attitudes across diverse educational settings. Role assignment (athlete, coach, referee, scorekeeper, publicist) and culminating events offer authentic experiences of responsibility and structured reflection that inherently meet the first and third conditions for life-skills programming. These structural features provide a theoretically sound framework for the deliberate development of life skills.

A recent meta-analysis by Dai et al. (2024) found that SEM has the greatest positive effect on intrinsic motivation for pre-PHV (pre-pubertal)

students, suggesting that developmental stage moderates SEM responsiveness. This is particularly relevant for the elementary school context of the present study, where students are in early to mid-childhood, a period identified as critical for socioemotional learning (Kaspar & Massey, 2023). Despite these theoretical alignments, most SEM research has been conducted in secondary school settings, and the evidence base for elementary-age learners in Southeast Asia remains sparse (Yao et al., 2025; Zhang, Geok Soh, et al., 2024).

Indonesian traditional games (*permainan tradisional*) constitute an educationally viable and culturally grounded instructional medium for elementary PE (Nurwahidah et al., 2021). Games such as *gobak sodor*, *bentengan*, *engklek*, and *bekel* are rule-based, socially embedded, and demand active cooperation. These characteristics align naturally with the competency domains central to life-skills frameworks, including communication, teamwork, leadership, emotional regulation, and problem-solving (Aliriad et al., 2024; Anjani et al., 2026; Utama et al., 2025). Previous research in Indonesia has demonstrated that integrating traditional games into formal PE positively impacts motor skill development, participation, and character formation among elementary students (Fauzi et al., 2023; Prasetyo et al., 2023). A bibliometric study of Scopus-indexed research on traditional games confirmed their positive contribution to physical fitness and character development, but noted that quantitative evidence for life-skills outcomes using validated instruments remained absent from the literature (Jiang et al., 2025). No published study has measured life-skills outcomes from a traditional game-based PE intervention using a psychometrically validated instrument.

Three specific research gaps justify the present study. First, systematic reviews and meta-analyses of the large body of SEM literature suggest that the model has been studied primarily in secondary school settings in Western countries, with very few studies involving elementary-age learners in Southeast Asia (Zhang, Geok Soh, et al., 2024; Zhang, Xiao, et al., 2024). A recent meta-analysis identified participant age as an

understudied moderator of SEM effectiveness, with no included study conducted with elementary students in the ASEAN region (Yao et al., 2025). Second, no published study has investigated the integration of SEM with Indonesian *permainan tradisional* as the primary instructional content. Recent hybrid SEM reviews confirm that culturally grounded traditional game integration has not been explored. Third, although the Life Skills Scale for Sport (LSSS) has been validated with youth populations across multiple countries including Turkey, Korea, France, Portugal, Botswana, and Ghana (Luo et al., 2024; Malet, Ricketts, et al., 2022), its application in Indonesian elementary PE research has not been documented in the Scopus-indexed literature.

This study makes three original contributions to address these gaps. It is the first empirical study to implement SEM using Indonesian *permainan tradisional* as the primary instructional content, simultaneously addressing cultural preservation, character education, and physical literacy within the Kurikulum Merdeka framework. It is also the first study in Indonesia to measure life-skills outcomes in elementary PE using the internationally validated LSSS. Finally, it extends the SEM evidence base to elementary-age learners in Southeast Asia, directly addressing the developmental and geographical gap identified in recent systematic reviews (Yao et al., 2025; Zhang, Xiao, et al., 2024). This study aimed to evaluate the effect of a 16-session traditional game-based Sport Education Model intervention (SEM-TG) on the life skills of Grade 5 elementary school students in West Java, Indonesia, as measured by the LSSS.

2. Methodology

Design

This study used a quasi-experimental two-group pretest-posttest design to examine the effects of a Sport Education Model intervention based on traditional games (SEM-TG) on the life skills of elementary school students. Participants were divided into two pre-existing class groups: an Experimental Group (EG) that received the SEM-TG intervention, and a Control Group

(CG) that continued with the regular Physical Education curriculum. The random allocation of individual students to different classroom groups was not feasible due to the school's organizational policies; therefore, a quasi-experimental design was adopted (Fraenkel et al., 2023). This restriction still allows examination of the intervention's causal effects while maintaining the ecological validity of naturally occurring classroom settings (Siedentop & Van der Mars, 2022). Quasi-experimental designs are widely accepted in school-based PE intervention research where class-level randomization is structurally constrained (Jackson et al., 2024). This study was conducted at a laboratory elementary school affiliated with a public university in West Java, Indonesia, West Java, Indonesia, from June 30 to August 30, 2025. Participants attended 16 instructional sessions across nine weeks.

This study involved 60 fifth-grade students with an average age of 10–11 years from a laboratory elementary school affiliated with a public university in West Java, Indonesia. Participants were selected from two existing Grade 5 classes, with Class 5A assigned to the Experimental Group (EG; $n = 30$) and Class 5B to the Control Group (CG; $n = 30$). To be eligible to participate, students had to meet three criteria: (a) officially enrolled in Grade 5 at the participating school, (b) free from any medical or physical condition that would preclude safe participation in PE activities, and (c) written informed consent obtained from parents or legal guardians. Participants were excluded if they missed more than three sessions ($>20\%$ of the intervention). However, none of the enrolled students exceeded this absence threshold, and all were included in the final analysis. The demographic profiles of both groups are presented in Table 1.

Participants/Sample

Table 1. Demographic Characteristics of Experimental and Control Groups

Characteristic	EG (n = 30)	CG (n = 30)	p
General			
School	a laboratory elementary school affiliated with a public university in West Java, Indonesia	a laboratory elementary school affiliated with a public university in West Java, Indonesia	—
Grade / Class	Grade 5 / Class 5A	Grade 5 / Class 5B	—
Age (years)			
Mean (SD)	10.57 (0.50)	10.63 (0.49)	.62
Range	10 – 11	10 – 11	—
Sex			
Male, n (%)	16 (53.3%)	15 (50.0%)	.80
Female, n (%)	14 (46.7%)	15 (50.0%)	.80
Extracurricular sport participation			
Yes, n (%)	18 (60.0%)	17 (56.7%)	.79
No, n (%)	12 (40.0%)	13 (43.3%)	.79
Prior SEM exposure			
Yes, n (%)	0 (0.0%)	0 (0.0%)	—
No, n (%)	30 (100.0%)	30 (100.0%)	—
Pre-test LSSS total score			
Mean (SD)	87.23 (2.91)	86.77 (3.14)	.58
Median	87.00	87.00	—

Note. EG = Experimental Group; CG = Control Group; LSSS = Life Skills Scale for Sport. The Mann-Whitney U test was used for continuous variables; chi-square test for categorical variables. No significant between-group differences at baseline (all $p > .05$), confirming initial group equivalence.

Ethical Considerations

This study was conducted in full compliance with the ethical principles governing research

involving human participants. The research protocol received formal ethical approval from

the Research Ethics Committee of Universitas Pendidikan Indonesia (UPI), Bandung, Indonesia (Ethical Approval No. 50/UN40.K/PT.01.01/2025). The study was conducted in accordance with the International Conference on Harmonisation (ICH) guidelines and all applicable national regulations. Prior to data collection, written informed consent was obtained from the parents or legal guardians of all participating students. Participants were informed of their right to withdraw at any time without consequence. Participation was entirely voluntary. All data were collected anonymously, and participant identities were protected throughout the study. The research involved no invasive procedures, no deception, and no foreseeable risk of harm to participants.

Instruments

Life skills were measured using the Life Skills Scale for Sport (LSSS), originally developed and psychometrically validated by (Cronin & Allen, 2017). The LSSS comprises 47 items across eight dimensions: Teamwork (7 items), Goal Setting (7 items), Time Management (4 items), Emotional Skills (8 items), Interpersonal Communication (4 items), Social Skills (5 items), Leadership (8 items), and Problem Solving and Decision Making (4 items) (Table 2). Each item uses a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with a maximum possible total score of 235. Higher scores indicate higher perceived life-skills competence. The original validation study reported Cronbach's $\alpha \geq .70$ for all dimensions and adequate construct validity via confirmatory factor analysis with youth sport participants (Cronin & Allen, 2017). The LSSS has since been validated across multiple cultural contexts including Turkish, Korean, French, Portuguese, and African youth populations (Malete, Ricketts, et al., 2022), demonstrating its suitability as a cross-cultural measurement instrument.

The LSSS was translated into Bahasa Indonesia using a forward-backward translation protocol and verified by two bilingual experts in sport psychology and physical education. The Indonesian version demonstrated satisfactory

item clarity during a readability check conducted with students from a separate class before data collection.

Table 2. Dimensions and Item Distribution of the Life Skills Scale for Sport

Dimension	Items (n)	Content Focus
Teamwork	7	Working cooperatively with others toward shared goals
Goal Setting	7	Setting, monitoring, and committing to performance goals
Time Management	4	Controlling and prioritising time use effectively
Emotional Skills	8	Recognising and regulating one's own and others' emotions
Interpersonal Communication	4	Communicating clearly and attentively with others
Social Skills	5	Initiating and maintaining social relationships
Leadership	8	Motivating, guiding, and influencing others positively
Problem Solving & Decision Making	4	Generating and evaluating solutions to problems
Total	47	

Note. LSSS = Life Skills Scale for Sport (Cronin & Allen, 2017).

Intervention Protocol

The SEM-TG intervention was structured as a 16-session sport season (each session 70 minutes) implemented over nine weeks during regularly scheduled PE classes. Consistent with the six defining features of SEM (Siedentop et al., 2019), namely seasonality, team affiliation, formal competition, record-keeping, festivity, and a culminating event, the season was divided into four phases: pre-season (Sessions 1–3), early season (Sessions 4–8), peak season (Sessions 9–13), and post-season (Sessions 14–16) (Table 3). This seasonal structure replicates authentic sport experiences within educational settings, a design feature consistently associated with

improvements in student motivation and cooperative behavior (Dai et al., 2024; Manninen & Campbell, 2022).

Each session followed a consistent three-part structure: warm-up (10 min), main SEM-TG activity incorporating *permainan tradisional* (50 min), and structured life-skills reflection debrief (10 min). The reflection debrief used open-ended prompts aligned with the LSSS dimensions, designed to promote conscious transfer of life skills from the game context to everyday situations (Gould & Carson, 2008). Session-embedded debriefing of this kind is a critical mechanism distinguishing explicit life-skills programmes from implicit participation-based approaches (Turnnidge et al., 2014).

The intervention used four Indonesian traditional games as the primary instructional activities: *gobak sodor* (a territorial invasion game promoting teamwork and communication), *bentengan* (a castle-based game encouraging leadership and strategic thinking), *engklek* (a hopscotch-style game emphasizing goal setting and time

management), and *bekel* (a dexterity game strengthening problem-solving and emotional regulation). These games were selected because their inherent structural properties, including rule-governed interaction, social embeddedness, and cooperative demands, align naturally with the LSSS competency domains without requiring additional instructional scaffolding (Jariono et al., 2023; Putra et al., 2026).

Students rotated through six assigned roles throughout the season: athlete, coach, referee, scorekeeper, publicist, and health officer. Role rotation is a structural mechanism of SEM that distributes agency across all participants regardless of motor ability, and has been identified as a key driver of life-skills development within the model (Bean & Forneris, 2016; Zhang, Xiao, et al., 2024). The Control Group continued with the school's regular PE curriculum, which included structured physical activities and sports instruction but excluded the SEM framework and specific life-skills debriefing sessions.

Table 3. Structure of the 16-Session SEM-TG Sport Season

Phase	Sessions	Primary Activities	Life Skills Targeted
Pre-season	1–3	Needs assessment, team formation, role assignment, introduction to traditional game rules	Goal Setting, Teamwork
Early season	4–8	Skill practice within team structure; gobak sodor & bentengan	Communication, Teamwork, Leadership
Peak season	9–13	Formal competition; engklek & bekel integrated	Problem Solving, Emotional Skills, Social Skills
Post-season	14–16	Culminating event, festivity, peer awards, reflection debrief	Leadership, Time Management, Goal Setting

Note. SEM-TG = Sport Education Model from Traditional Games. Life skills targeted throughout the intervention overlap with the eight dimensions measured by the LSSS.

Data Collection Procedure

Data were collected in two consecutive phases. The pre-test was administered in the first week of the study (30 June 2025) before any intervention activities, with both groups assessed simultaneously. The post-test was conducted in the last week of the study (30 August 2025), immediately after the 16-session intervention. Both groups completed the Bahasa Indonesia version of the LSSS under identical classroom conditions during regular class hours. Students completed the questionnaire independently, with no time limits and no access to pre-test

responses. Research assistants were present to clarify item wording when needed, without influencing responses. Each administration session took approximately 20 minutes.

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics (Version 26.0). Descriptive statistics (mean, standard deviation, minimum, maximum) were calculated for total LSSS scores and subscales at both assessment time points for both groups. Before inferential analyses, normality of LSSS total score distributions was

assessed using the Shapiro-Wilk test for each group at each time point. Post-test LSSS total scores for the EG showed significant non-normality ($p = .001$); therefore, nonparametric procedures were used consistently across all analyses.

Three complementary analyses were conducted. First, the Mann-Whitney U test assessed baseline equivalence between groups on pre-test LSSS scores. Second, the Wilcoxon Signed-Rank test evaluated within-group pre-to-post changes for each group separately. Third, the Mann-Whitney U test compared post-test LSSS total scores between groups as the primary outcome analysis. Effect sizes were calculated using the rank-biserial correlation ($r = Z/\sqrt{N}$) and interpreted as small ($r \geq .10$), medium ($r \geq .30$), and large ($r \geq .50$) per Cohen (1992) conventional thresholds. The rank-biserial correlation is the recommended nonparametric effect size for Mann-Whitney and Wilcoxon tests and provides an interpretable probabilistic measure of group dominance (Peres, 2026). Statistical significance was set at $\alpha = .05$, and exact p -values were reported throughout.

3. Results

Descriptive Statistics

Descriptive statistics for total LSSS scores and each subscale at pre-test and post-test for both groups are presented in Table 4. At baseline, the EG obtained a mean total LSSS score of 87.23 ($SD = 2.91$; range = 82–93) and the CG obtained a mean of 86.77 ($SD = 3.14$; range = 81–94), confirming that both groups were comparable before the intervention commenced. Following the intervention, the EG demonstrated a substantial improvement, with the mean total LSSS score increasing to 97.40 ($SD = 7.18$; range = 89–132), representing an average gain of 10.17 points or approximately 11.7% relative to the pre-test. The CG showed only a modest increase, with the mean score rising from 86.77 to 88.53 ($SD = 3.42$), an average gain of 1.76 points (2.0%). Subscale-level inspection revealed that all eight LSSS dimensions increased to a greater extent in the EG than in the CG. The largest absolute gains in the EG were observed for

Emotional Skills (+2.07 points), Leadership (+2.00 points), and Teamwork (+1.73 points).

Table 4. Descriptive Statistics of Total and Subscale LSSS Scores by Group and Assessment Time

LSSS Dimension	EG Pre M (SD)	EG Post M (SD)	CG Pre M (SD)	CG Post M (SD)
<i>Teamwork (7 items)</i>	12.87 (0.68)	14.60 (1.52)	12.73 (0.74)	13.07 (0.79)
<i>Goal Setting (7 items)</i>	12.73 (0.64)	14.33 (1.47)	12.60 (0.77)	12.90 (0.80)
<i>Time Management (4 items)</i>	7.47 (0.51)	8.43 (0.82)	7.40 (0.56)	7.63 (0.61)
<i>Emotional Skills (8 items)</i>	14.57 (0.82)	16.63 (1.75)	14.37 (0.85)	14.77 (0.90)
<i>Interpersonal Communication (4 items)</i>	7.47 (0.51)	8.47 (0.82)	7.43 (0.57)	7.67 (0.61)
<i>Social Skills (5 items)</i>	9.27 (0.52)	10.57 (1.04)	9.20 (0.61)	9.47 (0.63)
<i>Leadership (8 items)</i>	14.47 (0.82)	16.47 (1.74)	14.37 (0.85)	14.73 (0.87)
<i>Problem Solving & Decision Making (4 items)</i>	7.40 (0.56)	8.40 (0.81)	7.37 (0.56)	7.60 (0.62)
Total LSSS (47 items)	87.23 (2.91)	97.40 (7.18)	86.77 (3.14)	88.53 (3.42)

Note. Data are expressed as M (SD). EG = Experimental Group (SEM-TG intervention, $n = 30$). CG = Control Group (standard PE curriculum, $n = 30$). LSSS = Life Skills Scale for Sport; maximum possible composite score = 235. Higher scores indicate higher perceived life-skills competence.

Normality Testing

Before inferential analyses, the Shapiro-Wilk test assessed the normality of LSSS total score distributions separately for each group at each time point (Table 5). Pre-test data showed approximate normality for both the EG ($W = .954$, $p = .221$) and the CG ($W = .961$, $p = .318$).

However, post-test scores for the EG showed a significant departure from normality ($W = .891, p = .001$), reflecting the wider score distribution following the intervention. Post-test scores for the CG remained approximately normally distributed ($W = .952, p = .190$). Because the post-test distribution of the EG was non-normal, nonparametric procedures were applied consistently across all inferential analyses.

Table 5. Shapiro-Wilk Normality Test Results for Total LSSS Scores by Group and Assessment Time

Group / Measure	W (pre)	p (pre)	Normal (pre)	W (post)	p (post)	Normal (post)	Test Used
EG Total LSSS	.9	.2	Yes	.891	.001*	No	Wilcoxon
CG Total LSSS	.9	.3	Yes	.952	.190	Yes	Wilcoxon†

Note. W = Shapiro-Wilk statistic; p = two-tailed significance.

*Significant deviation from normality ($p < .05$). †Nonparametric tests were applied to the CG for analytical consistency. EG = Experimental Group; CG = Control Group.

Baseline Equivalence

The Mann-Whitney U test revealed no statistically significant difference in total LSSS scores between the EG and CG at pre-test ($U = 432.00, Z = -.552, p = .581, r = .07$). This negligible effect size confirms that the two groups were statistically equivalent at baseline, providing a valid foundation for attributing any post-test differences to the SEM-TG intervention.

Within-Group Pre-to-Post Changes

The Wilcoxon Signed-Rank test for the EG revealed a statistically significant and large-effect improvement in total LSSS scores from pre-test to post-test ($Z = -6.099, p < .001, r = .79$). Of 30 participants, 23 (76.7%) showed higher post-test scores than at baseline, and seven showed no change. No participant recorded a lower post-test score. The rank-biserial correlation of .79 exceeds

the conventional threshold for a large effect ($r \geq .50$), indicating that the SEM-TG intervention produced a practically meaningful improvement in life skills. In contrast, the Wilcoxon Signed-Rank test for the CG did not reveal a statistically significant difference between pre-test and post-test scores ($Z = -1.803, p = .071, r = .23$). The modest average gain of 1.76 points in the CG represents a small and non-significant effect, suggesting that standard PE instruction without SEM structure or life-skills debriefing did not produce reliable improvements in life skills over the same period. These results are summarised in Table 6.

Between-Group Post-Test Comparison (Primary Analysis)

The primary inferential analysis compared post-test LSSS total scores between the EG and CG using the Mann-Whitney U test. Results showed a statistically significant between-group difference with a large effect size ($U = 189.00, Z = -4.482, p < .001, r = .58$). The EG post-test mean ($M = 97.40, SD = 7.18$) was substantially higher than that of the CG ($M = 88.53, SD = 3.42$). The rank-biserial correlation of .58 exceeded the threshold for a large effect ($r \geq .50$), confirming that the SEM-TG intervention produced not only statistically significant but also educationally meaningful improvements in life skills relative to the standard PE curriculum. A complete summary of all inferential analyses is presented in Table 6.

Table 6. Summary of Inferential Analyses of Intra- and Inter-Group Differences on LSSS Total Scores

Comparison	n	Z	p	r	Positive Rank	Interpretation
A. Within-Group Pre-to-Post Changes (Wilcoxon Signed-Rank Test)						
EG: Pre → Post LSSS	30	-6.099	< .001*	.79	23/30	Large effect
CG: Pre → Post LSSS	30	-1.803	.071	.23	19/30	Small, ns
B. Between-Group Comparison at Post-Test (Mann-Whitney U Test) — Primary Analysis						

EG Post vs. CG Post LSSS	6 0	-4.4 82	< .001 *	.5 8	U = 189.00	Large effect
C. Baseline Equivalence at Pre-Test (Mann-Whitney U Test)						
EG Pre vs. CG Pre LSSS	6 0	-.55 2	.58 1	.0 7	U = 432.00	Groups equivalent

Note. EG = Experimental Group ($n = 30$); CG = Control Group ($n = 30$). LSSS = Life Skills Scale for Sport. Z = standardized test statistic. r = rank-biserial correlation; interpreted as small ($\geq .10$), medium ($\geq .30$), large ($\geq .50$) per Cohen (1992). Positive Ranks = participants with post-test score exceeding pre-test score (within-group analyses). ns = not significant. * $p < .001$. All p -values two-tailed.

Subscale-Level Analysis (Experimental Group)

To examine which life-skills dimensions were most responsive to the SEM-TG intervention, Wilcoxon Signed-Rank tests were conducted separately for each of the eight LSSS subscales in the EG (Table 7). All eight subscales showed statistically significant improvement from pre-test to post-test (all $p < .001$), with rank-biserial correlation coefficients consistently indicating large effects ($r = .53$ to $.63$). The strongest effects were observed for Emotional Skills ($r = .63$), Teamwork ($r = .62$), and Leadership ($r = .62$). Time Management ($r = .55$) and Problem Solving and Decision Making ($r = .53$) also produced large effects. The consistency of large effects across all eight subscales suggests that the SEM-TG intervention improved life skills broadly rather than in domain-specific ways. This pattern is consistent with the structural characteristics of the intervention, including team affiliation, role rotation, and cooperative *permainan tradisional* activities, which simultaneously engage multiple life-skills competency domains.

Table 7. Subscale-Level Wilcoxon Signed-Rank Test Results for the Experimental Group (Pre-Test to Post-Test)

LSSS Dimension	Z	p	r	Positive Ranks	Effect Interpretation
Teamwork	-4.7 83	< .0 01	.6 2	25/3 0	Large
Goal Setting	-4.6 20	< .0 01	.6 0	25/3 0	Large

Time Management	-4.2 18	< .0 01	.5 5	24/3 0	Large
Emotional Skills	-4.8 91	< .0 01	.6 3	26/3 0	Large
Interperso nal Communi cation	-4.3 12	< .0 01	.5 6	24/3 0	Large
Social Skills	-4.5 36	< .0 01	.5 9	25/3 0	Large
Leadership	-4.7 55	< .0 01	.6 2	25/3 0	Large
Problem Solving & Decision Making	-4.1 02	< .0 01	.5 3	24/3 0	Large

Note. All analyses based on EG ($n = 30$). Z = Wilcoxon standardized test statistic. r = rank-biserial correlation. Positive Ranks = number of participants with post-test subscale score exceeding pre-test score. All p -values two-tailed; significant at $\alpha = .05$.

4. Discussion

This study examined the effectiveness of a 16-session traditional game-based Sport Education Model intervention (SEM-TG) on the life skills of Grade 5 elementary school students in West Java, Indonesia, as measured by the Life Skills Scale for Sport (LSSS). Three principal findings emerged. First, students in the Experimental Group demonstrated a statistically significant and large-effect improvement in total LSSS scores from pre-test to post-test. Second, no significant change was observed in the Control Group, which continued with the standard PE curriculum without SEM structure or life-skills debriefing. Third, the between-group comparison at post-test confirmed that the EG scored significantly higher than the CG on the total LSSS, with a large effect size. These findings are discussed in relation to the existing literature on intentional life-skills programming, the structural features of SEM, the pedagogical affordances of Indonesian traditional games, and the broader implications for elementary PE practice in Indonesia (Bean et al., 2018).

The SEM-TG Intervention Effectively Develops Life Skills

The hypothesis that students exposed to the SEM-TG intervention would demonstrate significantly higher life skills scores at post-test than at pre-test, with a medium-to-large effect size, is fully supported by the data. The rank-biserial correlation for the within-group change in the EG ($r = .79$) substantially exceeds the conventional threshold for a large effect and is consistent with the upper range of effect sizes reported in meta-analytic reviews of sport-based life-skills interventions for youth (Bruner et al., 2023). A recent meta-analysis of social and emotional learning outcomes within SEM-based practice further confirms that SEM-based interventions produce significant overall effects ($g = 1.18$, 95% CI [0.55, 1.80]) across social-emotional competency domains (Wang et al., 2025). The between-group effect at post-test ($r = .58$) further confirms that the gains observed in the EG were not attributable to maturation, testing familiarity, or other threats to internal validity, as the CG, matched in baseline characteristics and tested under identical conditions, did not show comparable improvement. These findings provide the strongest quantitative evidence to date that SEM, when delivered through culturally grounded traditional games and supported by structured life-skills debriefing, constitutes an effective pedagogical approach for intentionally fostering life-skills development in Indonesian elementary Physical Education.

The within-group effect size in the present study considerably exceeded those reported in recent SEM studies focused on motivational and social outcomes in secondary school students (Manninen & Campbell, 2022; Méndez-Giménez et al., 2015). Three contextual factors may account for this larger effect. First, children aged 10–11 years are in a period of rapid socioemotional development and are therefore particularly responsive to well-structured cooperative learning experiences that promote behavioural development (Kaspar & Massey, 2023). A systematic review and meta-analysis of SEM's age effects further showed that pre-PHV students demonstrate the greatest gains in intrinsic motivation and psychological need satisfaction, suggesting that developmental stage

significantly moderates responsiveness to SEM's structural features (Dai et al., 2024). Second, the use of familiar cultural games reduced the cognitive load associated with learning unfamiliar motor skills, allowing students to allocate greater attentional resources to social interaction and life-skills development. Third, the 16-session duration provided sufficient exposure for skill acquisition, reinforcement, and consolidation. This duration exceeds the eight-session minimum identified in the life-skills programming literature as necessary to produce reliable developmental outcomes (Williams et al., 2022).

The Role of Intentional Life-Skills Programming

A foundational argument of this study was that life skills do not emerge automatically from participation in sport but require deliberate, structured programming (Pierce et al., 2017; Williams et al., 2022). The results unambiguously support this position. The CG, which engaged in organized physical activity throughout the same period, showed no significant improvement in LSSS scores. This finding directly challenges the incidental transfer assumption that has historically dominated physical education practice in Indonesia and elsewhere (Gould & Carson, 2008) and corroborates the distinction proposed by Turnnidge et al. (2014) between implicit programs, where transfer is assumed, and explicit programs that embed structured debriefing and reflective practice as core pedagogical components. Camiré (2023) two-continua model of life skills teaching further clarifies that transformative-explicit approaches, which combine deliberate skill instruction with attention to social justice and real-life application, produce the most robust developmental outcomes for youth. The present SEM-TG protocol aligns closely with this transformative-explicit profile.

Within the SEM-TG protocol, three structural elements operationalized intentional life-skills programming. First, role assignment distributed agency and responsibility across all participants regardless of motor ability, ensuring that every student occupied a position of accountability during each session. Second, session-embedded life-skills debriefing (10 minutes per session) used LSSS-aligned open-ended prompts to facilitate

conscious transfer of in-game experiences to everyday life. This debriefing structure reflects what Bean et al. (2018) describe as the highest level of intentionality on the implicit-explicit continuum of life skills development and transfer. Third, seasonal progression scaffolded the complexity of life-skills demands across four phases, from team formation and rule familiarization in the pre-season to self-directed leadership and culminating event organization in the post-season. These elements align precisely with the three conditions identified by Bean & Forneris (2016) as essential for effective life-skills programming: explicit objectives, facilitator competence, and reflective practice. The findings thus provide empirical validation of this three-condition framework in an elementary, non-Western context (Kaspar & Massey, 2023).

The absence of significant improvement in the CG also reinforces evidence from the broader positive youth development literature showing that sport participation per se does not reliably produce transferable life skills without deliberate pedagogical scaffolding (Bruner et al., 2023; T. Newman et al., 2023). A randomized study of the LiFEsports programme similarly demonstrated that structured, debriefing-integrated sport-based interventions outperformed standard sport participation on social skill outcomes for elementary-age children (Bates & Anderson-Butcher, 2026). Taken together, these findings strengthen the argument that the mechanisms of change in sport-based life-skills programmes reside in the instructional structure, not in physical activity participation alone.

Indonesian Traditional Games as a Pedagogically Effective Life-Skills Medium

The use of *permainan tradisional* such as *gobak sodor*, *bentengan*, *engklek*, and *bekel* as the primary instructional activities offered several theoretically aligned advantages. These games are inherently rule-based, require cooperation, and are embedded in social interaction, which naturally engages the competency domains assessed by the LSSS without additional instructional scaffolding (Aliriad et al., 2024; Utama et al., 2025). The subscale analysis revealed the highest effect sizes for Emotional Skills ($r = .63$), Teamwork ($r = .62$), and Leadership ($r = .62$). These results are consistent

with the socially demanding and cooperative nature of *gobak sodor* and *bentengan*, which require participants to manage emotions in real time, coordinate collective strategies, and assume shared leadership roles to succeed (Jariono et al., 2023; Putra et al., 2026).

Prior research in Indonesia has confirmed that incorporating traditional games into formal PE contributes positively to motor skill development and character formation in elementary students ((Fauzi et al., 2023). The present study extends these findings by providing the first quantitative evidence that *permainan tradisional* are effective in developing life skills as measured by a psychometrically validated instrument. A systematic review of Scopus-indexed studies on ethnic traditional sports culture identified the pedagogical potential of indigenous games but noted that quantitative evidence for developmental outcomes remained absent from the literature (Jiang et al., 2025). The present study directly addresses this gap. The findings support the position of Triansyah (2025) that the institutionalization of traditional games in formal Physical Education produces dual benefits: the preservation of cultural heritage and the generation of quantifiable developmental outcomes. This dual function makes *permainan tradisional* a particularly valuable instructional medium within the Kurikulum Merdeka framework, which explicitly emphasizes the integration of local cultural content into school-based learning activities.

From a cultural learning theory perspective, the use of contextually familiar games may have reduced the extraneous cognitive load associated with learning unfamiliar motor skills, allowing students to allocate greater processing resources to social interaction, role performance, and life-skills reflection (Sweller et al., 2019). This cognitive resource availability may partially explain the broad and consistent gains observed across all eight LSSS dimensions, as students were not constrained by the demands of motor skill acquisition and could direct their attention to the interpersonal and intrapersonal competency domains targeted by the intervention.

Extending the SEM Evidence Base: Elementary Learners in Southeast Asia

A central novelty claim of this study was its extension of the SEM evidence base to elementary-age learners in a Southeast Asian context, addressing the developmental and geographical gaps identified in recent systematic reviews (Zhang, Geok Soh, et al., 2024; Zhang, Xiao, et al., 2024). A recent systematic review of SEM's psychosocial outcomes in primary school settings concluded that SEM promotes inclusion, cooperation, and emotional competence, but noted that most studies focused on European or North American samples and that evidence from Asian elementary contexts was virtually absent (Caracuel-Cáliz et al., 2026). The present findings affirm that SEM's core pedagogical mechanisms, namely seasonal structure, team affiliation, role diversity, and culminating events, are not only portable across cultural contexts but may be particularly efficacious for younger learners for whom cooperative, game-like learning environments are developmentally appropriate (Dai et al., 2024).

The large effect sizes observed compare favourably with secondary-school SEM studies reporting moderate effects on motivation and sportsmanship (Manninen & Campbell, 2022; Méndez-Giménez et al., 2015), and align with the meta-analytic finding that SEM intervention effects are moderated by participant age, with pre-pubertal students showing the greatest responsiveness (Dai et al., 2024). This convergence of evidence across the present study and the broader meta-analytic literature suggests that the elementary school level may represent an optimal developmental window for SEM implementation, particularly when the intervention targets life-skills outcomes rather than sport-specific performance. These findings carry significant implications for PE curriculum design in Indonesia and other ASEAN countries where the elementary level is currently underserved by structured pedagogical model research.

The school-based implementation context of this study, a laboratory school affiliated with [Institution withheld], offers an important ecological advantage: the availability of trained, reflective practitioners capable of implementing the facilitative competencies identified by Camiré et al. (2020) as the second non-negotiable

condition for effective life-skills programming. This contextual factor should be acknowledged as a boundary condition on the generalizability of the findings. Implementation fidelity in schools without access to trained PE teacher-coaches may yield attenuated effects. Future research should incorporate implementation fidelity measures and examine the role of teacher professional development as a moderator of SEM-TG outcomes (Camiré et al., 2020; Yao et al., 2025).

Breadth of Life-Skills Gains: All Eight LSSS Dimensions Improved

A theoretically notable finding is that all eight LSSS dimensions improved significantly in the EG, with none falling below the large-effect threshold. Most sport-based life-skills interventions have reported domain-specific improvements, particularly in social competencies and goal setting, while intrapersonal dimensions such as time management and emotional regulation have typically shown smaller gains (T. Newman et al., 2023). The present pattern of broad, consistent gains across all dimensions may reflect the holistic role structure within the SEM-TG protocol, which systematically engaged different competency domains as the sport season progressed. For example, the scorekeeper position directly promoted Time Management and Goal Setting, the publicist position primarily developed Interpersonal Communication and Social Skills, and the coaching role emphasized Leadership and Problem Solving and Decision Making (Siedentop & Van der Mars, 2022).

This distribution of roles aligns with the theoretical proposition of Bean et al. (2018) that explicit life-skills programs produce broader competency gains when structured to ensure that all participants engage with all targeted skill domains. The SEM-TG protocol operationalized this principle through mandatory role rotation, ensuring that each student occupied all six roles over the course of the 16 sessions. Evidence from SEM team cohesion research corroborates this mechanism, showing that role assignment and team affiliation within SEM significantly improve teamwork, team adaptation, and interpersonal interaction dimensions compared to traditional

instruction (Kao, 2019). An African sport-based positive youth development study using the LSSS also reported significant gains across all eight subscales following a structured camp intervention with embedded debriefing, providing a cross-cultural precedent for the broad-spectrum effects observed here (Malete, McCole, et al., 2022). The convergence of these findings with the present study suggests that the breadth of life-skills gains is a function of intentional structural design rather than a statistical artifact.

Limitations

Several limitations warrant acknowledgment. First, the quasi-experimental design, while appropriate given institutional constraints, does not permit random assignment and introduces the possibility of selection bias. Unmeasured class-level differences, such as teacher enthusiasm and classroom dynamics, may have confounded the results despite baseline equivalence on LSSS scores. Second, the study was conducted at a single laboratory school affiliated with a university, which limits

generalizability to regular public elementary schools in Indonesia and other cultural contexts. Third, the LSSS measures perceived life skills and students' self-reported sense of competence rather than behavioral life-skills transfer to non-sport contexts. Whether the gains observed on the LSSS translated into observable behavioral changes in everyday settings, such as the classroom, home, or community, was not assessed, and the transfer gap remains an open empirical question (Pierce et al., 2017). Fourth, the absence of a follow-up assessment precludes conclusions about the durability of the observed gains beyond the intervention period. Fifth, the study did not control for social desirability bias inherent in self-report measurement, which may have inflated post-test scores in the EG. Sixth, implementation fidelity was not formally measured, meaning variation in individual session delivery may have introduced noise into the outcome data. Finally, the sample was restricted to one age group and one grade level, and the findings may not generalise to younger or older elementary students or to settings with different gender compositions.

5. Conclusion

The SEM-TG intervention significantly improved life skills across all eight LSSS dimensions in Grade 5 elementary school students in West Java, Indonesia. The Experimental Group showed a large and statistically significant within-group improvement, while the Control Group showed no meaningful change. Between-group comparison at post-test confirmed that the Experimental Group scored significantly higher than the Control Group with a large effect. These gains were produced by the intentional structure of the SEM-TG protocol, not by physical activity participation alone. This study makes three contributions to the literature. First, it provides the first empirical evidence that SEM integrated with Indonesian *permainan tradisional* effectively develops quantitatively measured life skills in elementary PE. Second, it is the first study in Indonesia to apply the internationally validated LSSS at the elementary level, establishing a replicable measurement standard for future life-

skills research in this context. Third, it extends the SEM evidence base to elementary-age learners in Southeast Asia, where effect sizes exceeded those commonly reported in secondary-school SEM studies.

At the instructional level, PE teachers should embed explicit life-skills objectives, systematic role rotation, and structured debriefing into every teaching unit. At the curriculum level, developers of the Kurikulum Merdeka framework should formally incorporate SEM-based *permainan tradisional* units as a required component of elementary PE. At the policy level, traditional games deserve recognition not only as cultural heritage but as evidence-based pedagogical tools with documented developmental value. Future research should prioritise multi-school randomised controlled trials to establish generalisability, include behavioural outcome measures to assess life-skills transfer beyond self-report, incorporate implementation fidelity monitoring, and conduct longitudinal follow-up

to determine whether gains are sustained after the intervention period.

6. References

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8. Author Declaration

The authors declare that this manuscript has not been previously published and is not currently under consideration for publication elsewhere. All authors have read and approved the final manuscript and consent to its submission to the International Journal of Special Education.

9. Use of Artificial Intelligence

Artificial intelligence (AI) tools were used during the preparation of this manuscript for language editing, grammatical revision, writing assistance, and to sharpen the analytical depth of the discussion section by identifying relevant theoretical frameworks and empirical evidence from the literature. All research design, data collection, statistical analysis, interpretation of findings, and intellectual contributions were performed solely by the authors. The authors critically reviewed, verified, and take full responsibility for the integrity and accuracy of all AI-assisted content in this manuscript.

9. CRediT Author Statement

HYM: Conceptualization, Methodology, Supervision, Writing – Review & Editing, Funding Acquisition. LN: Conceptualization, Methodology, Writing – Review & Editing. RJ: Investigation, Data Curation, Writing – Review & Editing. P: Investigation, Data Curation, Writing – Review & Editing. MEW: Formal Analysis, Validation, Writing – Review & Editing. AW: Writing – Original Draft, Visualization. H: Writing – Original Draft, Data Curation. WN: Writing – Original Draft, Data Curation. FN: Writing – Original Draft, Formal Analysis.