



Integrating Life Skills into a Volleyball-Based Positive Youth Development Program for School Students: A Quasi-Experimental Study

Ever Sovensi^{1*}, Muhammad Suhdy¹, Uray Gustian²

¹Universitas PGRI Silampari, Indonesia

²Universitas Tanjungpura, Indonesia

*Correspondence: E-mail: ever_sovens@yahoo.co.id

ABSTRACT

This study examined whether a volleyball-based Positive Youth Development (PYD) program with explicit life skills integration produces greater improvements in transferable life skills than regular volleyball activities. A quantitative quasi-experimental pretest–posttest control-group design was employed with 86 students, comprising 44 students in the experimental group and 42 in the control group. The experimental group participated in a 12-session, eight-week volleyball-based life skills program, whereas the control group participated in regular volleyball activities. Life skills were assessed using the Life Skills Scale for Sport-Transfer. Data were analyzed using descriptive statistics, mixed-design repeated-measures ANOVA, partial eta squared, and Cohen's *d*. Both groups showed improvements from pretest to posttest; however, the experimental group demonstrated a greater increase in life skills scores, from $M = 3.209$ to 4.246 , compared with the control group, which increased from $M = 3.447$ to 4.138 , despite having a higher baseline score. The time $\times$ group interaction was statistically significant, $F(1, 84) = 25.918$, $p < .001$, partial $\eta^2 = .236$, with a large effect for the gain-score difference ($d = 1.10$). These findings suggest that volleyball can contribute to the development of transferable life skills when embedded within an intentional PYD framework. The results highlight the importance of explicit pedagogical integration of life skills rather than relying on sports participation alone

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INTRODUCTION

Sport-based youth development programs have increasingly been recognized as strategic settings for promoting adolescent personal and social development, particularly within school contexts where students require structured opportunities to develop competencies beyond academic learning. Within this field, Positive Youth Development (PYD) provides a strength-based framework that views young people not as problems to be managed, but as individuals with assets, agency, and developmental potential (Lerner et al., 2005). Studies on PYD through sports indicate that organized sports can support competence, confidence, connection, character, caring, and broader developmental outcomes when programs are intentionally designed and delivered in supportive environments (Holt et al., 2017). Rather than assuming that participation in sports automatically produces positive outcomes, contemporary PYD scholarship emphasizes the importance of program quality, adult facilitation, and the explicit integration of developmental goals into sport activities (Coakley, 2016; Bean & Forneris, 2019; Camiré et al., 2022).

Life skills occupy a central position within sport-based PYD because they encompass transferable personal and social competencies that support students in functioning effectively across multiple domains of life. Competencies such as teamwork, communication, goal setting, leadership, problem-solving, decision-making, emotional regulation, and team management extend beyond their immediate relevance to sport performance and may contribute to student development within academic, family, peer, and community settings (Cronin et al., 2018; Jacobs et al., 2022). Nevertheless, the transfer of life skills from sports to non-sport contexts cannot be assumed to occur automatically through participations alone. Previous research indicates that effective life-skill programs require intentional instructional strategies, including explicit teaching, purposeful practice, reflective dialogue, and structured opportunities for participants to relate sport-based experiences to everyday situations (Kendellen et al., 2017; Newman et al., 2024). Accordingly, the educational value of sports is strengthened when participation is embedded within deliberate pedagogical processes rather than approached solely as physical activity.

In the present study, PYD is conceptualized as the overarching theoretical framework rather than as a directly assessed outcome. Its principles are operationalized through intentional pedagogical processes, including explicit instruction, guided practice, and structured reflection incorporated into the volleyball sessions. Within this framework, the development of transferable life skills is the primary empirical outcome. At the same time, the examination of their transfer to non-sport contexts constitutes the developmental mechanism by which PYD principles are expected to extend beyond the sporting environment. Volleyball was selected as the intervention context because its team-based and rule-governed nature requires continuous communication, cooperation, collective decision-making, role coordination, and shared responsibility among players. These characteristics create authentic opportunities for life skills to be intentionally taught, practiced, reinforced, and subsequently connected to experiences outside sports. Thus, the study is more accurately positioned as a PYD-informed life-skill intervention implemented through volleyball rather than as a comprehensive empirical evaluation of PYD outcomes.

Volleyball is a relevant medium for integrating life skills because it is a collective sport that requires cooperation, communication, role awareness, emotional control, tactical decision-making, and shared responsibility among players. Unlike individual activities, volleyball requires students to continuously coordinate with teammates, respond to dynamic game

situations, and regulate their behaviours under pressure. These characteristics make volleyball a suitable context for developing interpersonal and self-regulatory competencies. Previous studies have shown that organized sports and physical activity programs can support PYD by creating structured environments in which young people learn to collaborate, manage challenges, develop self-regulation, and apply acquired competencies in other areas of life (Kochanek & Erickson, 2020; McKinnon et al., 2022). PYD is also influenced by broader psychological and social factors, including personal experiences, family support, and community involvement, which indicates that sport-based programs should be designed as holistic developmental experiences rather than isolated technical training sessions (Wiium & Dimitrova, 2019).

The contemporary paradigm of sport development has shifted from development of sports, which emphasizes sport-specific outcomes, toward development through sports, which positions sport as a medium for wider personal and social outcomes. In this perspective, sport is used not only to improve physical skills and performance but also to promote health, education, citizenship, social inclusion, community engagement, and sustainable development (Rossi & Jeanes, 2016; Simon Rofo, 2021). This paradigm is particularly relevant in schools because students need learning experiences that integrate physical, psychological, social, and moral development. A volleyball-based program that explicitly integrates life skills can therefore serve as a pedagogical strategy for strengthening student developmental assets while maintaining the enjoyable and interactive nature of sport participations.

Volleyball-specific evidence for this proposition remains limited but promising. In a mixed-method study of competitive female youth volleyball players, a PYD-oriented intervention improved the player decision-making, a core transferable life skill, beyond what competitive training alone produced (Muñoz-Llerena et al., 2022). In a related study, a hybrid PYD program in extracurricular volleyball reported gains in personal and social responsibility, illustrating that the volleyball interactive and interdependent structure can be deliberately leveraged to develop life skills (Muñoz-Llerena et al., 2021). These studies suggest that volleyball is promising but still underexplored for the structured life skill programming, particularly for general school students rather than competitive athletes.

Despite the growing literature on sport-based PYD and life skills, several gaps remain. First, many studies have examined youth sport participations in relation to general developmental outcomes, but fewer intervention studies have investigated how volleyball can be systematically structured to teach transferable life skills among general school students (Zetou et al., 2022; Muñoz-Llerena et al., 2021). Second, although sport-based programs are often assumed to promote teamwork, communication, and leadership, these outcomes may not emerge consistently unless life skills are intentionally integrated into training sessions (Arantes et al., 2025). Comparable evidence from other sport contexts as illustrates by Weiss et al. (2020) found that a running-based PYD program produced greater life skill transfer than standard sports and physical education participations, while Hemphill et al. (2019) showed that the cognitive processes underlying life skill transfer depended on how explicitly programs help youth connect sport-based learning to broader life domains. Third, prior research continues to highlight challenges in program implementation, pedagogical quality, access, scalability, and sustained developmental outcomes (Newman et al., 2024; Piggott et al., 2024). Taken together, although previous research has demonstrated the general potential of sports and volleyball to support life-skill development, limited evidence exists on whether explicit life-skill instruction combined with structured reflection within volleyball activities produces greater improvements in transferable life skills than

conventional volleyball participation among general secondary-school students. Therefore, the present study aimed at addressing this specific gap.

Responding to these gaps, this study designed and tested a volleyball-based life skill development program for general school students. The intervention was structured according to the life skill integration principles proposed by Kendellen et al. (2017), in which each session introduced a focal life skill, embedded the skill into volleyball-based activities, and concluded with guided reflection on its transfer to everyday life. This study aimed to examine whether participations in a volleyball-based PYD program improved student transferable life skills compared with standard volleyball activities that did not explicitly integrate life skills. By focusing on general students in a school-based setting, this study contributes to PYD and sport pedagogy scholarship by providing empirical evidence on the pedagogical role of the explicit life skill integration in volleyball and by offering a practical model for using sports as a vehicle for student personal and social development.

METHODS

Design

This study employed a quantitative quasi-experimental design with a pretest-posttest control-group framework to examine changes in student transferable life skills following participation in a volleyball-based PYD program. A quasi-experimental design was adopted because the intervention was implemented within an existing school setting, where students participated through naturally occurring school-based groups rather than through individual random assignment to experimental conditions. Accordingly, randomization was applied at the participant-selection stage rather than at the treatment-allocation stage. The study therefore compared changes in life skills between an experimental group that received the volleyball-based PYD intervention and a control group that participated in regular volleyball activities without an explicit life-skill integration.

Participants

The study involved Senior High School students in Lubuk Linggau, Indonesia. Eligible participants were identified based on the following inclusion criteria: (1) being 15–17 years of age, (2) being actively involved in school extracurricular activities or volleyball-related activities, (3) obtaining parental or guardian consent, and (4) being willing to participate throughout the intervention period. From the population of students who met these eligibility criteria, participants were selected using a random sampling procedure. A total of 86 students were included in the study. Because the study was conducted within an existing school setting, participants were not individually randomized to treatment conditions. The selected students participated within the school-based groups designated for the study, resulting in an experimental group ($n = 44$) and a control group ($n = 42$). The experimental group participated in the volleyball-based PYD program with the explicit life-skill integration, whereas the control group undertook regular volleyball activities without structured life-skill instructions. This allocation procedure was consistent with the quasi-experimental nature of the study.

Materials and Apparatus

Transferable life skills were assessed using the Life Skills Scale for Sport–Transfer Scale (LSSS-TS) developed by Mossman et al. (2021). The LSSS-TS is a 40-item instrument designed to assess the extent to which life skills developed through sports are perceived to transfer to non-sport domains. The instrument comprises eight dimensions, including teamwork, goal setting, social skills, problem solving and decision making, emotional skills, leadership, time

management, and interpersonal communication. Each dimension is represented by five items addressing the application of the respective life skill across five non-sport domains, namely school/education, home/family, community, social settings, and employment. Responses are recorded on a five-point Likert-type scale ranging from 1 (not at all) to 5 (very much), with higher scores indicating a greater perceived transfer of life skills from sports to other areas of life.

For use with Indonesian Senior High School students, the instrument was administered in an Indonesian-language version. No items were removed from the original 40-item structure. Prior to the main study, the Indonesian version was pilot-tested with 100 students who had characteristics comparable to those of the study participants. Item-total correlations were examined as a preliminary item-analysis procedure. All retained items demonstrated correlations exceeding the reference value of $r = .164$. Internal consistency was evaluated using Cronbach's alpha, with coefficients of .70 or higher considered acceptable. Reliability coefficients across the eight dimensions ranged from .75 to .84: teamwork ($\alpha = .78$), goal setting ($\alpha = .81$), social skills ($\alpha = .76$), problem solving and decision making ($\alpha = .79$), emotional skills ($\alpha = .82$), leadership ($\alpha = .84$), time management ($\alpha = .75$), and interpersonal communication ($\alpha = .80$). The overall scale yielded a Cronbach's alpha coefficient of .837. All 40 items were retained following the pilot analysis. Item-total correlations were additionally examined as a preliminary assessment of item functioning. These analyses were interpreted as evidence of preliminary internal consistency and item performance rather than construct validity. The factorial structure of the Indonesian version was not independently evaluated in the present study. Therefore, the eight-factor structure was based on the psychometric evidence established for the original LSSS-TS.

Procedures

Before the intervention began, permission was obtained from the relevant school authorities, and the students were informed about the study purpose, procedures, and expectations. Both the experimental and control groups completed the Life Skills Scale for Sport-Transfer Scale (LSSS-TS) as a pre-test prior to the intervention.

The experimental group participated in a volleyball-based PYD program structured according to the life-skill integration principles proposed by Kendellen et al. (2017). The intervention consisted of 12 sessions delivered over six weeks, with two 90-minute sessions conducted each week. Each session focused on one or more targeted life skills, including teamwork, goal setting, social skills, problem-solving and decision-making, emotional skills, leadership, time management, and interpersonal communication. These competencies were not taught in isolation from volleyball practice. Rather, they were systematically embedded within technical and tactical volleyball activities to provide students with opportunities to experience, apply, and reflect on the targeted life skills in authentic sport situations.

Each intervention session followed a structured pedagogical sequence. First, the facilitator introduced the targeted life skill through a brief explanation and examples illustrating its relevance to both volleyball and everyday life. Second, the life skill was integrated into volleyball-based technical and tactical activities. For example, passing and cooperative drills were used to reinforce teamwork and interpersonal communication. Small-sided games were employed to develop problem-solving and decision-making, while rotational or leadership tasks were used to promote responsibility and leadership. Throughout these activities, the facilitator provided prompts, feedback, and reinforcement to help students recognize and intentionally practice the targeted competency.

Third, selected activities required students to apply the focal life skill through collaborative problem-solving, role negotiation, peer support, emotional regulation, and shared decision-making. Finally, each session concluded with a 5-10-minute guided reflection and debriefing, during which students discussed how the targeted life skill was demonstrated in the volleyball activities and how it could be applied in non-sport contexts, including school, family, peer relationships, and everyday life. This reflective component was incorporated to facilitate the intentional transfer of learning from the sport setting to broader life domains.

The control group participated in regular volleyball activities over the same six-week period, following the same frequency and session duration as the experimental group. These activities included warm-up exercises, basic volleyball drills, technical practice, and game play. However, they did not include explicit life-skill instructions, structured reflection, or systematic discussion of transfer to non-sport contexts. Following completion of the 12-session intervention, both groups completed the LSSS-TS as the post-test measure.

Design or Data Analysis

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics, including the mean, standard deviation, minimum and maximum values, standard error, and 95% confidence intervals, were calculated to summarize life-skill scores for the experimental and control groups at pre-test and post-test. Gain scores, calculated as post-test minus pre-test scores, were additionally reported as descriptive indices of change but were not treated as the primary inferential test of the intervention effect.

The primary inferential analysis was a 2×2 mixed-design analysis of variance (ANOVA), with Time (pre-test and post-test) as the within-subject factor and Group (experimental and control) as the between-subject factor. The principal effect of interest was the Time $\times$ Group interaction, which tested whether the magnitude of change in transferable life-skill scores from pre-test to post-test differed between the two groups. The main effect of Time was used to examine overall change across measurement occasions. In contrast, the main effect of Group represented the overall difference between the experimental and control groups across the two measurement points.

Prior to the mixed-design ANOVA, the assumptions underlying parametric analysis were examined. Distributional characteristics were assessed using descriptive indices of skewness, while homogeneity of variance between groups was evaluated using Levene's test. Because the within-subject factor contained only two levels (pre-test and post-test), the assumption of sphericity was inherently satisfied, therefore the Mauchly's test was not required. Statistical significance was established at $p < .05$.

Effect sizes for the mixed-design ANOVA were reported using partial eta squared (partial η^2) to indicate the magnitude of the main and interaction effects. The Time $\times$ Group interaction was treated as the primary statistical test for evaluating whether changes in transferable life skills differed between students who participated in the volleyball-based PYD intervention and those who participated in regular volleyball activities. Where appropriate, descriptive gain scores and group-specific pre-test and post-test means were used to facilitate interpretation of the interaction but were not interpreted as independent tests of intervention effectiveness.

RESULTS

Table 1 presents descriptive statistics and assumption-testing results for student life skill scores in the experimental and control groups. At pre-test, the control group had a higher mean score ($M = 3.447$, $SD = 0.296$, 95% CI [3.355, 3.539]) than the experimental group ($M =$

3.209, SD = 0.233, 95% CI [3.138, 3.279]), indicating that the two groups were not fully equivalent at baseline. Consequently, the analysis of post-intervention differences accounts for this initial imbalance by examining gain scores and the time x group interaction rather than relying on group comparisons alone. At post-test, both groups showed elevated life skill scores. The experimental group rose to M = 4.246 (SD = 0.232, 95% CI [4.176, 4.317]), while the control group rose to M = 4.138 (SD = 0.199, 95% CI [4.076, 4.200]). Despite the control group higher starting point, the experimental group achieved a higher post-test mean, indicating greater improvement among students in the volleyball-based PYD program than among those in standard volleyball activities without explicit life skill integrations.

The gain score provides the clearest descriptive index of improvement. The experimental group achieved a larger gain (M = 1.037, SD = 0.296, 95% CI [0.947, 1.127]) than the control group (M = 0.691, SD = 0.334, 95% CI [0.587, 0.795]), a difference of 0.346 points whose non-overlapping confidence intervals further indicate a consistent advantage for the volleyball-based PYD intervention over the standard volleyball participation. Assumption tests confirmed that the data were suitable for parametric analysis. Skewness values ranged from -0.772 to 0.454 across the pre-test, post-test, and gain scores, indicating no meaningful departure from univariate normality. Levene's test indicated homogeneity of variance for the pre-test (F = 2.843, p = .095), post-test (F = 0.474, p = .111), and gain score (F = 0.283, p = .596), all p > .05. As all significant values from Levene's test exceeded 0.05, the variances between the experimental and control groups can be deemed homogenous.

Table 1. Descriptive Statistics, Normality, and Homogeneity Testing for Student Life Skill Scores

		N	Minimum	Maximum	Mean	Std. Deviation	95% Confidence Interval for Mean		Normality	Homogeneity	
							Lower Bound	Upper Bound	Skewness	Levene Statistic	Sig.
Life Skill Pre-test	Experiment	44	2.760	3.610	3.209	0.233	3.138	3.279	-0.105	2.843	0.095
	Control	42	2.840	3.880	3.447	0.296	3.355	3.539	-0.598		
	Total	86	2.760	3.880	3.325	0.290	3.263	3.387			
Life Skill Post-test	Experiment	44	3.620	4.700	4.246	0.232	4.176	4.317	-0.772	0.474	0.111
	Control	42	3.760	4.640	4.138	0.199	4.076	4.200	0.244		
	Total	86	3.620	4.700	4.193	0.222	4.146	4.241			
Gain	Experiment	44	0.530	1.690	1.037	0.296	0.947	1.127	0.286	0.283	0.596
	Control	42	0.040	1.590	0.691	0.334	0.587	0.795	0.454		
	Total	86	0.040	1.690	0.868	0.358	0.791	0.945			

Table 2 presents the one-way ANOVA results comparing the experimental and control groups separately at pre-test, at post-test, and on gain scores. At pre-test, the groups differed significantly, $F(1, 84) = 17.342$, $p < .005$, eta-squared = .171, Cohen's d = 0.91 (large effect), confirming descriptively that the control group began the study with meaningfully higher life skill scores than the experimental group. At post-test, the groups again differed significantly, $F(1, 84) = 5.373$, $p = .023$, eta-squared = .060, Cohen's d = 0.51 (medium effect). However, this difference was now in the opposite direction, favouring the experimental group, indicating that the initial advantage held by the control group had not merely persisted but had been reversed. Most importantly for Hypothesis 2, the groups differed significantly on gain scores, $F(1, 84) = 25.874$, $p < .001$, eta-squared = .236, Cohen's d = 1.11 (large effect), indicating that the experimental group improvement from pre-test to post-test was substantially and significantly greater than the control group improvement. Because the gain-score comparison directly tests the magnitude of change attributable to the intervention while controlling for the baseline difference between groups, it constitutes the most appropriate and informative test of intervention effectiveness among the three comparisons reported in Table 2.

Table 1. One Way ANOVA Test Results

		Sum of Squares	df	Mean Square	F	Sig.	Eta2	Cohen's d
Life Skill Pre-test	Between Groups	1.220	1	1.220	17.342	0.001	0.171	0.91 (large)
	Within Groups	5.909	84	0.070				
	Total	7.129	85					
Life Skill Post-test	Between Groups	0.251	1	0.251	5.373	0.023	0.060	0.51 (medium)
	Within Groups	3.921	84	0.047				
	Total	4.172	85					
Gain	Between Groups	2.570	1	2.570	25.874	0.001	0.236	1.11 (large)
	Within Groups	8.345	84	0.099				
	Total	10.915	85					

DISCUSSION

This study examined changes in student self-reported transferable life skills following participations in a volleyball-based PYD program with explicit life-skill integrations compared with regular volleyball activities. Both groups reported higher scores from pre-test to post-test. However, the pattern of change differed between groups, with the experimental group showing a larger increase. Importantly, these findings should be interpreted as changes in student perceived transferability of life skills rather than as direct evidence that behavioural transfer occurred in school, family, peer, community, or other everyday-life settings. The LSSS-Transfer assesses participant perceptions of the applicability of skills developed through sports to non-sport contexts. Consequently, the present findings indicate an increased perceived capacity to apply these competencies beyond volleyball, rather than direct transfer behaviours.

This distinction is important for interpreting the findings within the broader literature on sport-based Positive Youth Development. Contemporary PYD scholarship emphasizes that participation in sports does not automatically generate developmental outcomes. Rather, such outcomes occur more likely when programs deliberately incorporate developmental objectives, appropriate adult facilitation, opportunities for practice, and structured reflection (Camiré et al., 2022). The present findings are consistent with this proposition. The experimental program explicitly introduced targeted life skills and embedded them within volleyball activities. It provided guided opportunities for students to reflect on how these competencies might be applied in other areas of life. The greater increase in self-reported transferable life-skill scores were observed in the experimental group. Therefore, the developmental potential of sports may be enhanced when life skills are deliberately embedded through explicit instructions, opportunities for practice, and structured reflection, rather than left to emerge implicitly through participations alone.

The findings also extend previous work examining volleyball as a context for PYD-oriented learning. Muñoz-Llerena et al. (2022) reported improvements in decision-making following a PYD-oriented intervention among competitive female volleyball players, while Muñoz-Llerena et al. (2021) identified gains in personal and social responsibility within a hybrid PYD volleyball program. The present study contributes to this body of evidence by examining

general school students and by comparing an explicitly structured life-skill program with regular volleyball participations. Nevertheless, the present outcome differs conceptually from directly observed behavioural development. The higher post-intervention scores indicate that students in the experimental condition perceived greater applicability of sport-related life skills across other life domains. They do not demonstrate that students subsequently enacted these competencies more frequently or more effectively outside the sport environment.

This interpretation is particularly relevant to the concept of life-skill transfer. Previous research has emphasized that transfer is unlikely to occur simply by participating in sports and that intentional pedagogical strategies are needed to help participants recognize connections between sport experiences and other domains of life (Kendellen et al., 2017; Chinkov & Holt, 2016). Similarly, Cronin & Allen (2018) emphasized the importance of participant perceptions that competencies developed through sports are applicable beyond the sporting environment. In the present intervention, guided reflection was used to encourage students to identify how teamwork, communication, leadership, emotional regulation, problem-solving, decision-making, goal-setting, and time management could be relevant to school, family, peer, and everyday life situations. Thus, the observed increase in LSSS-Transfer scores may reflect a stronger perceived connection between sport-based learning and non-sport contexts. However, because behaviours outside volleyball were not directly observed, the findings should not be interpreted as evidence that the actual transfer had occurred.

Volleyball may provide a particularly relevant pedagogical context for such learning because of its interactive and interdependent structure. Players are repeatedly required to communicate, coordinate actions, make rapid decisions, assume different roles, respond to errors, regulate emotions, and share responsibilities for collective performance. Passing and setting activities, for example, require communication and cooperation. Team rotations require role awareness and responsibility, while competitive rallies provide opportunities for emotional regulation and decision making. When explicit pedagogical prompts and structured reflection accompany these naturally occurring sport experiences, they may provide meaningful opportunities for students to recognize how similar competencies could be relevant outside of sports. In this sense, volleyball serves not merely as a setting for physical participation but as a potentially productive context in which personal and interpersonal competencies can be intentionally rehearsed and discussed.

The increase observed in the control group requires more cautious interpretation. Students who participated in regular volleyball activities also reported higher transferable life-skill scores at post-test. Because volleyball inherently involves cooperation, communication, shared goals, and interpersonal interaction, regular participation may provide experiences that students perceive as relevant to broader life contexts. However, the present design does not allow this increase to be attributed causally to regular volleyball participations. In particular, the study did not include a no-treatment or alternative-activity comparison condition. Therefore, other influences, such as repeated measurement, maturation, concurrent school experiences, peer interactions, or activities occurring outside the intervention, cannot be excluded. Accordingly, the control-group increase should be described as an observed increase in self-reported scores, rather than as definitive evidence that regular volleyball participations caused life-skill development.

The larger increase observed in the experimental group should likewise be interpreted within the constraints of the quasi-experimental design. The findings indicate that participation in the explicitly structured volleyball-based PYD program was associated with greater improvement in the perceived transferability of life skills than regular volleyball

activities. The pattern is consistent with the argument that developmental learning in sports may be strengthened when teachers or facilitators deliberately identify a target life skill, create opportunities to practice that skill within sport activities, reinforce relevant behaviours, and guide participants in reflecting on its potential application beyond sports. This interpretation shifts the study theoretical contribution away from merely confirming that sports can promote PYD and toward identifying the pedagogical conditions under which sports may have greater developmental potential.

From a theoretical perspective, the study therefore contributes to sport-based PYD scholarship by providing evidence consistent with an intentional-development perspective. Rather than treating sport participations itself as the developmental mechanism, the findings suggest that explicit instruction, guided practice, and structured reflection may be important processes through which students become more aware of the potential applicability of sport-based competencies in other areas of life. This interpretation aligns with the broader distinction between the development of sports and development through sports (Rossi & Jeanes, 2016). The contribution of the present study lies not in conclusively demonstrating behavioural transfer, but in showing that a deliberately structured volleyball program was associated with stronger self-reported perceptions of life-skills transferability than regular volleyball participation.

From a practical perspective, these findings indicate that physical education teachers and school sport facilitators should be cautious about assuming that transferable competencies emerge automatically from participations. Volleyball sessions can be deliberately structured to include explicit life-skill objectives, practice opportunities, feedback, and reflection without separating developmental learning from sport instructions. For example, teachers may introduce a focal competency at the beginning of a session, embed it in volleyball tasks, draw student attention to relevant behaviours during plays, and conclude with a reflection on how the competency could be applied in school, family, peer relationships, or other everyday settings. Such an approach may strengthen student awareness of the broader relevance of sport-based learning, although it remains to be seen whether these perceptions translate into sustained behavioural changes.

Several limitations should be considered when interpreting these findings. First, the study employed a quasi-experimental pretest-posttest control-group design without individual random assignment, and baseline differences between the groups cannot be entirely ruled out as a source of bias. Second, the outcome was assessed using a self-report measure. Accordingly, the LSSS-Transfer scores represent student perceptions of the transferability of life skills, not direct observations of whether those skills were actually enacted in non-sport settings. Future studies should combine self-report measures with teacher or parent ratings, behavioural observations, peer assessments, interviews, or situational assessments conducted in school, family, community, or other non-sport environments. Third, because the comparison condition consisted of regular volleyball rather than a no-treatment or alternative-activity condition, changes observed in either group cannot be attributed exclusively to volleyball participations or to the intervention itself. Fourth, only pre-test and post-test assessments were conducted, preventing conclusions regarding the persistence of perceived transferability or subsequent behavioural enactment over time. Longitudinal follow-up is therefore needed to determine whether increased perceptions of transferability are sustained and subsequently reflected in observable behaviours across non-sport contexts.

Future research should therefore move beyond perceived transferability by examining whether students actually apply sport-based life skills in other domains and whether such application is sustained over time. Multi-method designs that combine self-report measures

with behavioural indicators would provide stronger evidence regarding the distinction among life-skill development, perceived transferability, and demonstrated transfer. Further studies could also compare explicitly structured PYD programs with regular sports, alternative physical activities, and no-intervention conditions to clarify which changes are specifically attributable to intentional life-skill pedagogy.

CONCLUSION

The findings of this study suggest that participation in a volleyball-based PYD program with explicit life-skill integration was associated with greater improvements in student self-reported transferable life skills compared with regular volleyball activities. Although both groups reported higher scores from pre-test to post-test, the experimental group showed a greater improvement than the control group. This pattern indicates that intentionally embedding life skills within volleyball through explicit instruction, guided practice, and structured reflection may strengthen student perceptions of the applicability of these skills beyond the sport context.

These findings should, however, be interpreted within the constraints of the quasi-experimental design. Because participants were not individually randomized and the groups differed at baseline, the observed differences cannot be attributed exclusively to the intervention. Moreover, the LSSS-Transfer assesses student perceptions of the transferability of life skills rather than directly observed behaviours in school, family, peer, community, or other everyday-life settings. Therefore, the findings provide evidence of improvement in perceived life-skills transferability, but they should not be interpreted as direct evidence that actual behavioural transfer occurred.

Nevertheless, the study highlights the educational potential of volleyball when developmental objectives are deliberately integrated into sport instruction. Rather than assuming that participation alone is sufficient to promote broader developmental outcomes, the findings suggest that the developmental value of sports may be enhanced when students are explicitly introduced to targeted life skills, provided with opportunities to practice them within sport activities, and guided to reflect on their potential application beyond sports. This approach may offer a practical framework for physical education teachers and school sport facilitators seeking to integrate personal and social learning into volleyball-based programs.

Future research should employ randomized or more rigorously controlled designs, include alternative-activity or no-treatment comparison conditions, and incorporate behavioural observations, teacher or parent ratings, peer assessments, and longitudinal follow-up. Such approaches are needed to determine whether improvements in perceived transferability are sustained over time and translate into observable use of life skills across non-sport contexts.

AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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