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Life Skills and Volleyball Teaching: Comparison Between TGfU and Direct Instruction Model

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Abstract: The learning environment created by the physical education teacher, through the teaching model employed, can significantly influence students' engagement during lessons. Therefore, this study aimed to compare tactical-technical learning and students' self-perceptions of life skills between TGfU and direct instruction. The sample consisted of 67 students, aged between 13 and 15 years, enrolled in the ninth grade of a municipal public school, and the research design involved an intervention consisting of 18 sessions, each lasting 60 min. The results revealed no significant differences between the teaching models regarding tactical-technical variables ($p > 0.05$). However, concerning life skills, the TGfU/HVs group demonstrated higher mean teamwork scores than the Traditional group ($p = 0.008$). On the other hand, the Traditional and Control groups achieved higher mean scores for goal setting skills than the TGfU/HVs group ($p = 0.001$ for both cases). These findings highlight that the organization of sports practice, despite variations in teaching models, fosters students' self-perceptions of life skills, underscoring the necessity of further research to deepen the understanding of game-based pedagogies in school physical education. It is also imperative to reflect on implementing additional pedagogical practices in schools that align with institutional objectives and actively promote student learning.

Keywords: team sports; performance; constructivism; tactical-technical; learning

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1. Introduction

Physical education teaching in many schools focuses on the teacher, technical skills, and repetitive movement patterns, often failing to foster student motivation, particularly among those uncomfortable with sports (Ferraz et al., 2023; González, 2020). This traditional approach, rooted in direct instruction, places students as mere supporting actors in the teaching and learning process and needs to be rethought considering contemporary theories, especially student-centered ones (Alcalá & Garijo, 2017; Arufe-Giráldez et al., 2023; Pill et al., 2024).

In this context, contemporary methods have been designed to mitigate the negative aspects inherent in traditional approaches, such as the overemphasis on technique, the decontextualized teaching of game ecology, and the lack of student motivation in physical education classes (Arufe-Giráldez et al., 2023; González, 2020; Pill et al., 2024). The Teaching Games for Understanding (TGfU) approach emerged as a response, positioning the student at the center of the learning process and emphasizing cognitive processes such as perception,

decision-making, and comprehension (Bunker & Thorpe, 1986). TGfU promotes learning in sports by prioritizing tactical and game understanding over technical skills (Alcalá & Garijo, 2017).

Originally grounded in constructivist principles, TGfU seeks to facilitate active knowledge construction, enabling meaningful learning opportunities and fostering social cooperation (Backes et al., 2023). Within this theoretical framework, knowledge is constructed through the negotiation and reinterpretation of the world, allowing students to take responsibility for their meaningful learning by connecting prior knowledge with new insights through cooperative and group activities (Backes et al., 2022, 2023; Beni et al., 2021; Galvão et al., 2022).

Studies on teaching models reveal that both TGfU and direct instruction effectively enhance skills in controlled situations (Batez et al., 2021). TGfU, however, enables students to practice adapted versions of sports, promoting the simultaneous learning of multiple aspects of a sport (Cocca et al., 2020). Furthermore, TGfU positively impacts learning time, increases student engagement, and improves participation in the learning process (Indrayogi, 2021; Tangahu, 2019), contributing significantly to motivation and performance (Romadhona et al., 2024). However, it should be considered that the benefits pointed out by this method depend on the culture in which people are immersed, as this factor requires further investigation and understanding for the implementation of teaching models (Nuñez et al., 2023; T. Zhou & Colomer, 2024).

Despite its benefits, challenges still need to be overcome when adopting TGfU as a regular practice in physical education. Theory and research in this field often need to provide explicit or practical solutions for professionals' day-to-day work (Papagiannopoulos et al., 2023). Morales-Belando et al. (2022) emphasize that the effectiveness of TGfU depends on critical resources, including contextualized lesson planning, a minimum of twelve hours of instruction per unit, adequate teacher training, well-structured modified games (in terms of quantity, difficulty, and timing), and the inclusion of teacher questioning during activities.

Given the challenges of implementing this teaching method, there is a pressing need to integrate significant components from various teaching models, leading to what is known as pedagogical model hybridization (González-Víllora et al., 2019). Hybrid models incorporating TGfU have been shown to make sports teaching more engaging (Batez et al., 2021; García-González et al., 2020), enhancing students' perceived success in practice (Ortiz et al., 2023). Additionally, hybrid models that utilize TGfU help design more equitable and inclusive learning environments for both genders (Gil-Arias et al., 2021), offering more significant participation opportunities and fostering participants' physical literacy (Cairney et al., 2019).

In the specific context of volleyball, hybrid approaches improve technical performance in skills such as serving, passing, and setting (Batez et al., 2021), as well as physical performance (Stojanović et al., 2023), engagement, motivation, and enjoyment (Batez et al., 2021; García-González et al., 2020; Gil-Arias et al., 2017). Beyond tactical-technical aspects, school-based approaches should emphasize human development, recognizing students as assets to be nurtured (Bowers et al., 2021; Malete et al., 2022).

The literature shows that TGfU has been hybridized with various teaching models, such as Sports Education (Gil-Arias et al., 2020, 2021; Tendinha et al., 2021), enabling students to learn through and for sports. Additionally, other models articulate with TGfU to foster holistic student development (Shen & Shao, 2022; Stolz & Pill, 2014). This aligns with Brazil's national curriculum framework (*Base Nacional Comum Curricular*—BNCC), which emphasizes the importance of experiential learning in schools to foster ethical, conscious, and reflective decision-making in defense of human rights and democratic values (Brasil, 2018).

According to the BNCC, in addition to fostering self-awareness and self-care regarding the body and health, socialization and entertainment in the school environment promote interdisciplinary dialogue and broaden students' understanding of the social dynamics and phenomena associated with physical practices (Brasil, 2018). Consequently, promoting social-emotional competencies, including self-awareness, self-management, social awareness, relationship skills, and responsible decision-making, is essential for fostering empathetic and cooperative citizens while strengthening students' mental well-being (Frimaio et al., 2024).

Although distinct approaches, Positive Youth Development (PYD) shares common ground with TGfU by reducing risky behaviors, such as delinquency, substance abuse, violence, and school dropout, while reinforcing youths' virtues and strengths (Esperança et al., 2013). Effective PYD requires sustained positive relationships between youth and adults, activities that develop life skills, and opportunities for youth to apply these skills as participants or leaders in community activities (Lerner et al., 2005, 2011).

In this context, transferring life skills learned through sports to everyday life hinges on intentional teaching and deliberate pedagogical strategies to maximize youth development outcomes (Bean et al., 2018; Malete et al., 2022; Z. Zhou et al., 2020). Two distinct teaching approaches are evident: an implicit approach, where the development of life skills occurs without explicit discussion of their transferability (Malete et al., 2022), and an explicit approach, where specific pedagogical strategies are employed to facilitate the transfer of these skills, with open discussion during lessons (Bean et al., 2022; Turnnidge et al., 2014). Simply teaching sports is insufficient to guarantee the transfer of life skills; instead, explicit instruction in life skills transfer is fundamental to the educational process in school sports (Jacobs & Wright, 2018; Zheng et al., 2023).

Although research on TGfU in school settings (Alcalá & Garijo, 2017; Barba-Martín et al., 2020; Ortiz et al., 2023) and teaching life skills through sports education (Coppola et al., 2024; Esperança et al., 2013; Holt et al., 2020) is extensive, little is known about the impact of combining these approaches in physical education. When considering the relationship between TGfU and psychosocial variables, it is noted that there is little production, although this subject is inherent to the comprehensive formation of the subject for adult life (Ortiz et al., 2023). In this context, the combination of teaching sports through TGfU together with life skills is based on the need to rethink the holistic development of students since TGfU leverages constructivist principles (Butler, 2006; Fagundes & Ribas, 2019; Kirk & Macdonald, 1998). At the same time, life skills focus on positive youth development by emphasizing their strengths and virtues (Camiré & Santos, 2019). These complementary approaches align with the BNCC, Brazil's guiding document for primary education (Brasil, 2018).

Based on the potential of these teaching approaches and the existing knowledge gap regarding their combined use compared to traditional teaching methods, this study aimed to compare tactical-technical learning and students' self-perceptions of life skills between the TGfU and direct instruction models. The following hypotheses were formulated: (a) the TGfU group will demonstrate tactical-technical performance comparable to the direct instruction group; and (b) the TGfU group will score higher in life skills than the direct instruction group.

2. Materials and Methods

2.1. Sample

The sample consisted of 67 students from a public municipal school in Goiânia, comprising both sexes, aged between 13 and 15 years, all enrolled in the ninth grade of elementary school. To determine the sample size, a priori power analysis was performed using G*Power software (v. 3.1.9.7). The study by Dalamitros et al. (2023) served as a

reference, estimating a sample size sufficient to achieve 95% power to detect a medium effect size (d = 0.30) with a significance criterion of $\alpha = 0.05$. This calculation indicated a minimum sample size of 27 participants. However, to align the data collection with the school's pedagogical structure, it was decided to organize each group as a specific class, resulting in one class of 23 students for the TGfU group and two classes of 22 students each for the traditional instruction and Control groups.

Inclusion criteria required participants to be enrolled in the school and willing to participate voluntarily. Exclusion criteria included any injury preventing effective participation in classes or tests, absence on scheduled testing days, or missing more than 25% of the lessons. An ethics committee approved the study (approval code: CAAE 65290217.2.0000.5083).

2.2. Experimental Design

Implementing the TGfU teaching model in a Brazilian public school and explicitly teaching life skills required training for the physical education teacher participating in the research. In this context, the teacher underwent a 25-day training program with an experienced researcher in the area, with a doctorate and over 10 years of experience, where the basic principles and the implementation method of the physical education class were presented. During the 25 days of training, the physical education teacher who applied the TGfU model taught 18 classes to a group of physical education students, not used as a sample for this experiment, with the same age as the intervention group. All classes were recorded. After recording the classes, the physical education teacher met, always after each class, with the experienced researcher and two other physical education teachers with master's degrees who had expertise in teaching sports based on TGfU. The classes were attended, and discussions were held to ensure that the TGfU model adhered to constructivist precepts. It is reported that the last five classes of the training period were already within what is recommended in the TGfU. As an additional precaution, the first five classes taught by the teacher in the intervention group were recorded for analysis with the experienced researcher.

To ensure the application of life skills in the experimental group, all lesson plans were validated by an experienced researcher in the area and always had the following structure: at the beginning of the class, the teacher conceptualized the life skills that would be explicitly taught; at the end of each exercise, the students were asked about how they applied the life skill taught in the class in the exercise; and at the end of the class, the teacher explained that the skills taught should be part of the students' daily lives, with examples of application outside the school context. To end the class, the teacher asked the students for examples of how to apply the taught life skill in their daily lives, helping to illustrate how the skill could be transferred to life. In addition, the next class began with the teacher asking if the students had applied the life skills outside of the school context and asking some students to give examples.

Participants were divided into three groups: TGfU group—volleyball was taught using the TGfU model, incorporating explicit instruction of life skills; Traditional group—volleyball was taught using direct instruction, with life skills taught implicitly; Control group—a different sport was taught, with life skills also taught implicitly.

Pre-tests were conducted over two days to assess potential differences in technical-tactical learning and life skills acquisition. Post-tests were administered similarly after a unit of 18 lessons, with each lesson lasting 60 min. The intervention and data collection period occurred between February and March, with three classes per week.

Each student was analyzed over three sets of 15 points. For consistency, the post-test retained the pre-test team compositions and matchups. The matches were recorded from above the court using two cameras positioned approximately 4 m behind each end

line, elevated 4 m off the ground. A GoPro Hero 8 Black (GoPro, Inc., San Mateo, CA, USA) recorded in HD 1080 p at 60 Hz. To ensure intra- and inter-observer reliability, 20% of the sample was reanalyzed, yielding Kappa values above 0.82, exceeding the recommended threshold.

2.3. Tactical-Technical Performance

Tactical-technical performance was evaluated using the Game Performance Assessment Instrument (GPAI), validated by Collet et al. (2011) as the Instrument for Assessing Tactical-Technical Performance in Volleyball (IAD-Vb). The evaluation included two specific indicators: 1—Specific Performance by Action (SPA), which assessed serve, reception, set, attack, and defense; and 2—Specific Performance by Component (SPC), which evaluated adjustment, efficiency, decision-making, and effectiveness.

Adjustment refers to the preparation phases for executing actions; efficiency assesses technical execution; decision-making evaluates strategic options; and effectiveness measures outcomes of fundamental skills. During the assessment, students were divided into 6-player teams and played 6x6 volleyball matches. Adaptations included two serves per team regardless of scoring, rotation after each team's serves, and sets capped at 15 points.

2.4. Life Skills

The Life Skills Scale for Sport (P-LSSS) (Nascimento Junior et al., 2020) assessed students' perceptions of learning life skills. The scale evaluates eight core life skills associated with sports participation: teamwork, goal setting, social skills, problem solving and decision-making, emotional skills, leadership, time management, and interpersonal communication skills (Johnston et al., 2013). The P-LSSS showed a high intraclass correlation coefficient for its validation (Nascimento Junior et al., 2020), making it suitable for this study's objectives.

2.5. Statistical Procedures

Descriptive data were presented as means and standard deviations. The Friedman test was employed as tactical-technical response data did not meet normality assumptions. A two-way repeated-measures ANOVA was used for students' self-perceptions of life skills and success perception variables, which displayed normal distribution, considering group (intervention types) and time (pre- and post-tests) as factors, with Bonferroni post hoc adjustments where necessary. Effect sizes were calculated as follows: partial eta squared (η^2_p) for ANOVA (0.01 = small, 0.06 = medium, and 0.14 = large), and Kendall's W for the Friedman test (0.1–<0.3 = small and 0.3–<0.5 = moderate). All analyses were conducted using SPSS (Version 25.0 for Windows, SPSS Inc., Chicago, IL, USA), with a significance level of $p \leq 0.05$.

3. Results

3.1. Tactical-Technical Performance

The comparison of specific performance by action using the Friedman test revealed no significant differences between groups for serve [χ^2 (5) = 7.434; p = 0.190; W = 0.078], reception [χ^2 (5) = 12.725; p = 0.26; W = 0.196], setting [χ^2 (5) = 4.333; p = 0.502; W = 0.433], attack [χ^2 (5) = 6.538; p = 0.257; W = 0.654], and defense [χ^2 (5) = 5.00; p = 0.416; W = 0.654] (Table 1).

Table 1. Results of mean scores for pre- and post-test specific performance by action (SPA).

	TGfU Group		Traditional Group		Control Group	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
Serve	25.73 (±2.47)	6.70(±5.97)	30.35 (±2.39)	34.34 (±1.49)	33.95 (±1.73)	32.24 (±2.02)
Reception	16.82 (±4.04)	21.33 (±3.57)	8.59 (±3.14)	18.26 (±2.26)	22.77 (±3.82)	20.59 (±1.98)
Setting	2.08 (±2.08)	12.50 (±0)	3.75 (±2.50)	13.75 (±2.42)	15.47 (±4.33)	5.35 (±2.52)
Attack	12.50 (±5.70)	8.23 (±2.60)	0 (±0)	12.55 (±3.31)	17.04 (±4.22)	15.86 (±2.18)
Defense	16.25 (±7.80)	15.00 (±3.97)	0 (±0)	19.37 (±6.87)	28.12 (±7.74)	27.34 (±2.68)

The specific performance by component analysis using the Friedman test revealed no significant differences between groups in adjustment [χ^2 (5) = 4.240; p = 0.515; W = 0.039], efficiency [χ^2 (5) = 7.256; p = 0.202; W = 0.066], and effectiveness [χ^2 (5) = 7.243; p = 0.203; W = 0.092]. However, when considering decision-making, the Friedman test indicated significant differences between groups [χ^2 (5) = 30.717; p = 0.001; W = 0.279]. Pairwise comparison tests showed that the Control group achieved a higher mean score in the pre-test compared to the TGfU/Life Skills group (p = 0.038), and the Traditional group achieved a higher mean score in the post-test compared to the pre-test (p = 0.033) (Table 2).

Table 2. Results of mean scores for pre- and post-test specific performance by component (SPC).

	TGfU Group		Traditional Group		Control Group	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
Adjustment	0.15 (±0.15)	0.64 (±0.45)	3.38 (±2.10)	0.58 (±0.46)	0.37 (±0.37)	0 (±0)
Efficiency	64.70 (±4.37)	64.28 (±5.32)	62.36 (±5.29)	60.81 (±4.54)	67.03 (±4.54)	54.39 (±4.34)
Decision-Making *,a	0.15 (±0.15)	3.11 (±1.23)	0.75 (±0.52)	6.46 (±1.53)	5.55 (±1.26)	5.46 (1.30)
Effectiveness	24.08 (±4.25)	30.80 (±3.62)	31.64 (±4.62)	38.57 (±4.25)	39.99 (±3.66)	36.66 (±4.46)

* Difference between pre-test and post-test scores for the Control group. [a] Difference between the pre-test scores of the TGfU/Life Skills group and the Traditional group.

3.2. Life Skills

The repeated-measures ANOVA revealed a significant difference in the teamwork scores for the group factor [(F (2,34) = 4.862; p = 0.014; η^2_p = 0.019] but not for the time factor [F (1,21) = 1.583; p = 0.222; η^2_p = 0.070], and the interaction between group and time [(F (2,42) = 0.614; p = 0.546; η^2_p = 0.28]. The Bonferroni post hoc analysis showed that the TGfU/Life Skills group had significantly higher scores than the Traditional group (p = 0.008). For goal setting, the repeated-measures ANOVA revealed a significant difference in the group factor [(F (2,42) = 13.170; p = 0.001; η^2_p = 0.385] but no significant differences for the time factor [F(1,21) = 1.556; p = 0.226; η^2_p = 0.068], and the interaction between group and time [(F(2,42) = 1.838; p = 0.172; η^2_p = 0.080]. Bonferroni post hoc analysis indicated that the Traditional group scored higher than the TGfU/Life Skills group (p = 0.001), and the Control group scored higher than the TGfU/Life Skills group (p = 0.001). For other life skills, no significant differences were observed across groups: social skills—group factor [(F(2,42) = 0.130; p = 0.878; η^2_p = 0.006], time factor [(F(1,21) = 0.349; p = 0.561; η^2_p = 0.016], and interaction between group and time [(F(2,42) = 2.192; p = 0.124; η^2_p = 0.095]; problem solving—group factor [(F(2,42) = 0.946; p = 0.493; η^2_p =0.043], time factor [(F(1,21) = 0.486; p = 0.493; η^2_p = 0.023], and interaction between group and time [(F(2,42) = 2.581; p = 0.088; η^2_p = 0.109]; emotional skills—group factor [(F(2,42) = 0.164; p = 0.850; η^2_p = 0.008], time factor [(F(1,21) = 1.064; p = 0.314; η^2_p = 0.048], and interaction between group and time [(F(2,42) = 0.893; p = 0.417; η^2_p = 0.041]; leadership—group factor [(F(2,42) = 0.114; p =0.893; η^2_p = 0.005], time factor [(F(1,21) = 0.884;

$p = 0.358$; $\eta^2_p = 0.040$], and interaction between group and time [(F(2,42) = 1.919; $p = 0.159$; $\eta^2_p = 0.084$]; time management—group factor [(F(2,42) = 0.332; $p = 0.719$; $\eta^2_p = 0.016$], time factor [(F(1,21) = 0.159; $p = 0.694$; $\eta^2_p = 0.008$], and interaction between group and time [(F(2,42) = 2.135; $p = 0.131$; $\eta^2_p = 0.092$]; communication—group factor [(F(2,42) = 0.348; $p = 0.708$; $\eta^2_p = 0.016$], time factor [(F (1,21) = 0.002; $p = 0.964$; $\eta^2_p = 0.0001$], and interaction between group and time [(F(2,42) = 1.418; $p = 0.254$; $\eta^2_p = 0.063$] (Table 3).

Table 3. Results of mean scores for pre- and post-test life skills.

	TGfU Group		Traditional Group		Control Group	
	Pre	Post	Pre	Post	Pre	Post
Teamwork *	3,45 (±0.95)	3.80 (±1.15)	3.50 (±1.11)	3.62 (±0.93)	3.79 (±1.09)	3.79 (±0.93)
Goal Setting [ab]	2.57 (±0.69)	2.74 (±0.83)	3.75 (±1.16)	3.57 (±1.00)	4.01 (±1.06)	3.59 (±0.93)
Social Skills	3.44 (±0.90)	3.75 (±1.18)	3.59 (±1.08)	3.35 (±1.03)	3.61 (±1.31)	3.32 (±0.96)
Problem Solving	3.29 (±0.92)	3.87 (±0.88)	3.33 (±1.11)	3.22 (±0.78)	3.37 (±1.26)	3.21 (±1.08)
Emotional Skills	3.23 (±0.91)	3.68 (±1.08)	3.30 (±1.22)	3.34 (±0.70)	3.42 (±1.19)	3.39 (±0.87)
Leadership	3.17 (±0.82)	3.61 (±1.01)	3.40 (±1.05)	3.20 (±0.76)	3.32 (±1.12)	3.48 (±0.85)
Time Management	3.18 (±0.86)	3.53 (±1.27)	3.30 (±1.11)	3.00 (±0.90)	3.45 (±1.15)	3.21 (±1.11)
Communication	3.36 (±1.05)	3.67 (±1.15)	3.37 (1.12)	3.23 (±0.93)	3.59 (±1.18)	3.39 (±0.87)

* Significant difference between the TGfU/Life Skills group and the Traditional group in pre-test. [a] Significant difference between TGfU/Life Skills group and Traditional group in pre-test. [b] Significant difference between TGfU/Life Skills group and Control group in pre-test.

4. Discussion

Contemporary theories, which originated from the TGfU model, shifted the focus of sports education to the students themselves, with technical learning subordinated to tactical learning (Bunker & Thorpe, 1986; Kirk & MacPhail, 2002; Pereira et al., 2013). Within this new framework, TGfU has proven to be an effective method for both tactical and technical learning, engaging students in a more motivating manner (Alcalá & Garijo, 2017; Barba-Martín et al., 2020; Gil-Arias et al., 2017). At the same time, sports began to be perceived as a tool for social transformation, offering education beyond sport itself and facilitating the acquisition of life skills (Camiré et al., 2023; Nascimento Junior et al., 2022). Therefore, this study aimed to compare tactical-technical learning and students' self-perceptions of life skills between the TGfU model and the direct instruction model for ninth-grade students at a public school.

Our first hypothesis, that the TGfU/Life Skills group would perform similarly in terms of tactical-technical skills compared to the direct instruction group, was confirmed. The analysis of technical components, such as efficiency and effectiveness, showed no significant difference between the TGfU/Life Skills and direct instruction groups. These findings support the study by Batez et al. (2021) revealing the similar technical performance between the TGfU/Life Skills and direct instruction groups after a 12-session intervention with 54 students aged 14 to 16. Another study, Pereira et al. (2013), with students aged 11 to 13 years, observed similar improvements in technical skills from pre-test to post-test in both the constructivist model and the direct instruction group after 20 lessons. On the other hand, a study comparing technical learning in hockey over 15 teaching sessions found that the traditional teaching group exhibited greater technical learning than the TGfU group (Turner & Martinek, 1999). Regarding tactical learning, a study conducted with 88 students aged 11 to 12 years showed that after 15 sessions of 45 min, students exposed to constructivist interventions demonstrated superior game performance and

tactical skills compared to the direct instruction group (Rocamora et al., 2019). Similarly, a study with 40 students aged 11 to 12 found that students exposed to tactical game approaches showed improved decision-making and technical execution compared to the direct instruction group (González-Espinosa et al., 2021). These findings suggest that tactical-technical learning warrants further research, although TGfU appears to offer more benefits than direct instruction (Aburachid et al., 2019; González-Espinosa et al., 2021; Ortiz et al., 2023). Furthermore, it seems that decision-making and motor skills in more complex environments, such as actual game situations, require additional time to observe differences in learning (Nathan, 2016).

Our second hypothesis, that the TGfU/Life Skills group would score higher in life skills compared to the direct instruction group, was refuted. These results contradict the findings of those by Zetou et al. (2022) who examined the effect of a life skills program on 44 children aged 9 to 11 years and found that the program based on explicit life skills teaching was more effective, finding that students understood the concept and function of life skills and intended to use them in other areas. In another study, after an 8-month intervention with 61 young people aged 10 to 15 years, a basketball teaching program focused on the explicit development of life skills contributed to the transfer of life skills as perceived by participants (Ciampolini et al., 2020). This included implicit strategies (creating a mutual trust environment and positive coach behaviors) and explicit strategies (discussing life skills during practice and how to apply them in other contexts). Compared to the literature, the observed differences may be explained by the fact that younger students learn life skills more easily through implicit methods than older students due to cognitive maturity (Bean et al., 2022). Consequently, the implicit development group likely did not differ from the explicit development group, as the students were young and had lower cognitive maturity.

When comparing the constructivist and direct instruction models, sports teaching shows similarities in tactical-technical performance. This is likely due to integrating tactical and technical skills during instruction and tasks tailored to the students' motor and cognitive performance (Araújo et al., 2019; Batez et al., 2021; Pereira et al., 2013; Trajković & Kri, 2017). Beyond performance aspects, sports possess characteristics that influence daily life, and when it comes to life skills (Lerner et al., 2005) it is evident that sports also contribute to the development of life skills in a non-intentional manner (Holt, 2016). However, participating in a sports program does not guarantee positive outcomes (Coakley, 2016).

5. Conclusions

Given the findings, a practical application of this study suggests that sports education should explicitly focus on human development, specifying which aspects of human development will be addressed in each lesson plan. Therefore, schools should update their pedagogical political projects to outline how this should be implemented in teaching practice. Furthermore, it is suggested that the Brazilian federal government train school administrators and teachers in implementing pedagogical tools for comprehensive human development. This is especially important since sports practice is a means for developing more than just the tactics and techniques inherent in sports and the teaching model. However, an intervening factor may not be sufficient to alter students' perceptions of education. However, this research, like any other, is not without limitations. In this case, we must consider the possible impacts of COVID-19 on students' physical, cognitive, and motor skills. In Brazil, physical education classes gradually returned in 2022, which may have influenced this research in early 2023. In addition, the students sampled had not had volleyball experience in previous years, that is, this was their first contact with the sport. In this context, more classes may have been necessary for students to acquire knowledge

of this sport and present better sports performances in tactical, technical, and cognitive aspects. In addition, students were unaware of what life skills are, another aspect that may have influenced the perception and acquisition of the concepts of these skills throughout the intervention period. In this sense, we suggest that future research demands more time for intervention and, in its designs, considers the inclusion of variables related to the participation of the school community and family.

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Abbreviations

The following abbreviations are used in this manuscript:

TGfU	Teaching Games for Understanding
BNCC	*Base Nacional Comum Curricular*
PYD	Positive Youth Development
GPAI	Game Performance Assessment Instrument
P-LSSS	Life Skills Scale for Sport

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