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Total Pages

9 Page

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Total Words

3,767 Words

Submission Date

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Indonesian Journal of Physical Education and Sport Science

p-ISSN 2775-765X | e-ISSN 2776-0200

Volume 6, No. 4, Desember 2026. Page. x-xx

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Effectiveness of Skillastics Game Intervention on Social and Motor Skills among 11-Year-Old Children: A Quasi-Experimental Study in Urban and Rural Settings

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Received: xx Month 2026, Approved: xx Month 2026, Published: xx Month 2026

Abstract

Study purpose. This study aimed to analyze the effect of the Skillastics game on social skills and motor skills of 11-year-old children and to compare its effectiveness between urban and rural settings.

Materials and methods. A quasi-experimental matching-only pretest-posttest control group design was employed. A total of 144 children aged 11 years from four elementary schools in Bandung Regency, West Java, Indonesia were selected through purposive sampling and assigned to four groups: urban experimental (n=36), urban control (n=36), rural experimental (n=36), and rural control (n=36). The experimental groups participated in 8 Skillastics sessions over four weeks as an out-of-school activity. Social skills were assessed using the adapted Social Skills Improvement System (SSIS; Gresham & Elliott, 1987), and motor skills were measured using the Motorische Basiskompetenzen for fifth and sixth grade (MOBAK 5-6; Herrmann & Seelig, 2018). Data were analyzed using Two-Way MANCOVA followed by ANCOVA with pretest scores as the covariate.

Results. Skillastics significantly improved social skills ($F = 164.015$; $p < .001$; $\eta^2 = .543$) and motor skills ($F = 228.689$; $p < .001$; $\eta^2 = .624$). Significant differences between urban and rural children were found for social skills ($F = 54.732$; $p < .001$; $\eta^2 = .284$) and motor skills ($F = 137.939$; $p < .001$; $\eta^2 = .500$). Significant interaction effects between Skillastics and location were identified for social skills ($F = 9.769$; $p = .002$; $\eta^2 = .067$) and motor skills ($F = 8.169$; $p = .005$; $\eta^2 = .056$), with urban groups showing greater improvements.

Conclusions. Skillastics is an effective activity-based intervention for developing social skills and motor skills in 11-year-old children, with effects that vary depending on geographic context. Integration of the program into out-of-school physical activity programs at both urban and rural elementary schools is recommended.

Keywords: Skillastics, Social Skills, Motor Skills, Urban-Rural, Elementary School, Out-Of-School Activity

DOI: <https://doi.org/10.52188/ijpess.v6i4>

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Introduction

Individual development is a complex process encompassing biological, cognitive, and socio-emotional dimensions (Santrock, 2004). At age 11, children are in a critical transitional period between middle childhood and early adolescence, during which social competence and motor proficiency become increasingly important for successful participation in peer activities and academic contexts (Khoiruddin, 2018). Despite the recognized importance of these developmental outcomes, Indonesian schools tend to prioritize academic achievement, leaving social and motor development underserved in the formal curriculum (Tiara Syafputri, 2023).

Current global data indicate that 1 in 3 adults and 81% of adolescents do not engage in sufficient physical activity. In Indonesia, the Global School Health Survey (2023) revealed that approximately 76.2% of students aged 13–17 years are physically inactive, with 62% sleeping fewer than 8 hours per night (Indah Permata Hati, 2025). These conditions have direct implications for children's social and motor development. Inadequate physical activity negatively impacts health, social well-being, and quality of life (World Health Organization, 2025).

The development of social skills and motor skills among elementary school children remains an important issue in physical education (Widiana Kuspratiwi et al., 2026). Although physical activity interventions and motor development, limited evidence explains whether cooperative game-based interventions can simultaneously improve social and motor outcomes while considering differences between urban and rural learning environments (Ojeda-Troncoso & Campos-Campos, 2025).

Social skills are defined as learned, socially acceptable behaviors that enable a person to interact effectively with others (Gresham & Elliott, 1993). Within the CARES framework, social skills encompass Cooperation, Assertion, Responsibility, Empathy, and Self-Control. Deficits in these skills are associated with decreased academic performance and long-term psychosocial difficulties (Langeveld et al., 2012). Motor skills, assessed in this study using the Motorische Basiskompetenzen (MOBAK 5-6; Herrmann & Seelig, 2018), reflect children's ability to perform self-movement and object movement competencies that underpin physical literacy.

Skillastics, developed by Sandy Slade, (2021) is a cooperative physical activity program designed to develop social and motor skills through structured group games. Implemented as an Out-of-School Hours Activity (OSHA), the program aligns with evidence supporting the benefits of structured out-of-school physical activity for children's health and development (Coakley & Pike, 2014; Crowe et al., 2021).

The expected benefits of Skillastics for social and motor development can be situated within three complementary theoretical frameworks. First, Vygotsky's sociocultural theory (Yohanes, 2013) proposes that children develop social competence through interaction within their Zone of Proximal Development (ZPD), where peer cooperation and facilitator scaffolding during structured group tasks promote social learning; this is directly relevant to Skillastics' team-based format, which requires every member to contribute to a shared outcome. Second, Gallahue's Hourglass model of motor development (Goodway et al., 2019) situates 11-year-old children in the Application Stage of the Specialized Movement Phase, during which locomotor, manipulative, and stability skills become integrated into increasingly complex movement combinations; the multi-skill demands of Skillastics card tasks, which combine running, throwing, catching, dribbling, balancing, and rolling, are theoretically suited to stimulating motor refinement at this stage. Third, Bronfenbrenner's ecological systems theory (Guy-Evans,

2025) suggests that proximal microsystem characteristics, such as exposure to structured and adult-facilitated activity, shape children's readiness to internalize new social and motor demands, which provides a theoretical basis for anticipating that urban and rural children may respond differently to a structured intervention such as Skillastics. Taken together, these frameworks generate the expectation that Skillastics will improve both social and motor outcomes, while geographic context moderates the magnitude of this improvement.

16 Geographic context is an important moderator of physical activity and child development. Rural children tend to engage in unstructured outdoor free play, while urban children more frequently participate in organized activities under adult supervision (Andrade Neto et al., 2014; Salmon et al., 2013). These contextual differences may influence responsiveness to structured interventions such as Skillastics. Findings on this point remain mixed internationally: for example, a study of preschool children in Iran found that rural children scored higher than urban children on both motivation to move and fundamental movement skills (Nazarpouri et al., 2023) suggesting that the direction of the urban-rural gap may depend on age group, cultural context, and the specific skills assessed. At the level of pedagogical mechanism, a recent meta-analysis of cooperative learning in physical education reported its largest effect size in the social learning domain (Boke et al., 2025) reinforcing the theoretical expectation that a cooperative, team-based program such as Skillastics should be particularly effective for social skill development, though evidence directly comparing such effects across urban and rural Indonesian contexts remains scarce. However, previous studies have mostly examined physical activity interventions and motor development separately. Evidence regarding cooperative game-based interventions that integrate social and motor development while comparing urban and rural contexts in Indonesia remains limited.

This study therefore aimed to: (1) analyze the effect of Skillastics on social skills of 11-year-old children; (2) analyze the effect of Skillastics on motor skills; (3) compare social skills and motor skills between urban and rural children; and (4) analyze the interaction between Skillastics intervention and geographic location on both outcomes.

Materials and methods

Study participants

21 Participants comprised 144 children aged 11 years from four elementary schools in Kab. Bandung, West Java, Indonesia. Schools were selected through purposive sampling based on geographic classification (urban/rural) according to BPS (Indonesian Statistics Bureau) 2020 criteria (Badan Pusat Statistik Indonesia, 2021). Specifically, SDN Pelita Jaya and SDN Sidamukti represented urban schools, while SDN Pasir Malang and SDN Warnasari represented rural schools. 22 Participants were allocated to four groups: urban experimental (n=36), urban control (n=36), rural experimental (n=36), and rural control (n=36).

Study organization

11 This study employed a quasi-experimental matching-only pretest-posttest control group design. The factorial design was used to examine whether the effectiveness of Skillastics differed according to geographical context (urban and rural settings).

The experimental groups participated in 8 Skillastics sessions over four weeks (2 sessions per week, 60 minutes per session) outside regular school hours. Each session followed the standard Skillastics structure: orientation and card-task introduction (10 minutes); main game activity with six rotating teams (40 minutes); and character reflection and cool-down (10 minutes). Facilitators were physical education teachers who completed a two-day Skillastics training prior to the intervention. Control groups continued their regular physical activity program according to the school curriculum.

Social skills were measured using the Social Skills Improvement System (SSIS; Gresham & Elliott, 1987), adapted into Indonesian by Rizka & Kurniawati, (2018). The instrument consists of 24 items covering the CARES subscales (Cooperation, Assertion, Responsibility, Empathy, Self-Control), rated on a 4-point Likert scale. Internal consistency was confirmed with Cronbach's $\alpha = .834$.

Motor skills were assessed using Motorische Basiskompetenzen for fifth and sixth grade (MOBAK 5-6; Herrmann & Seelig, 2018). The instrument evaluates eight motor competency items across two domains: object movement (throwing, catching, bouncing, dribbling) and self-movement (balancing, rolling, jumping, running). All items demonstrated validity ($r = .459-.617$; $p < .001$). Reliability was confirmed with $\alpha = .951$ for object movement and $\alpha = .889$ for self-movement. Measurements were conducted at pretest (one week before intervention) and posttest (one week after the final session).

Statistical analysis

Data were analyzed using Two-Way MANCOVA with pretest scores as covariates to control for baseline differences. When significant effects were found, ANCOVA was conducted for each dependent variable separately. Assumptions verified prior to analysis included: normality (Shapiro-Wilk test), homogeneity of variances (Levene's test), homogeneity of covariance matrices (Box's $M = 24.933$; $p = .004$; Pillai's Trace was selected as the robust multivariate statistic), and homogeneity of regression slopes (parallelism test). Follow-up pairwise comparisons used Bonferroni correction. All analyses were performed in SPSS version 26.0 with $\alpha = .05$.

Results

Descriptive statistics for social skills (SS) and motor skills (MS) by group are presented in Table 1.

Table 1. Descriptive Statistics for Social Skills and Motor Skills by Group

Group	SS Pre M (SD)	SS Post M (SD)	MS Pre M (SD)	MS Post M (SD)
Urban Experimental (n=36)	65.27 (10.19)	73.97 (7.50)	7.22 (2.50)	10.36 (2.40)
Urban Control (n=36)	68.83 (7.84)	69.97 (8.28)	7.61 (2.41)	8.83 (2.18)
Rural Experimental (n=36)	68.83 (6.88)	71.61 (9.35)	7.41 (2.47)	9.02 (2.34)
Rural Control (n=36)	69.36 (9.62)	69.75 (8.36)	8.38 (2.41)	8.69 (2.47)

The multivariate test (Pillai's Trace) confirmed significant effects of Skillastics intervention ($F = 141.773$; $p < .001$; $\eta^2 = .674$), location ($F = 73.229$; $p < .001$; $\eta^2 = .517$), and their interaction ($F = 7.878$; $p = .001$; $\eta^2 = .103$) on the combined dependent variables. Univariate ANCOVA results are summarized in Table 2.

Table 2. ANCOVA Results for Social Skills and Motor Skills

Effect	Outcome	F	p	Partial η^2
Intervention	Social Skills	164.015	.000	.543
Intervention	Motor Skills	228.689	.000	.624
Location	Social Skills	54.732	.000	.284
Location	Motor Skills	137.939	.000	.500
Intervention $\times$ Location	Social Skills	9.769	.002	.067
Intervention $\times$ Location	Motor Skills	8.169	.005	.056

Skillastics explained 54.3% of posttest social skills variance and 62.4% of motor skills variance both representing very large effects. Urban children scored significantly higher than rural peers on both outcomes. The interaction effect indicated that the urban experimental group showed the greatest gains: social skills increased by 6.693 points (vs. 2.260 in rural), and motor skills increased by 1.873 points (vs. 1.259 in rural). Post hoc Bonferroni comparisons confirmed that all group differences were statistically significant (all $ps < .05$).

Discussion

This study demonstrated that Skillastics produced significant and large effects on both social skills and motor skills in 11-year-old children, with effect sizes substantially exceeding those reported in comparable interventions (Pacholík & Nedělová, 2017; Sun & Chen, 2024). The magnitude of improvement particularly for motor skills ($\eta^2 = .624$) reflects the program's capacity to deliver comprehensive and intensive motor stimulation through each game session.

Consistent with the sociocultural framework outlined earlier (Yohanes, 2013) The CARES components most visibly stimulated were Cooperation and Responsibility, which are structurally embedded in Skillastics' team format that requires every member to contribute to collective success (Gresham, F. M., & Elliott, 1987) These findings align with (Daubert et al., 2018; Pacholík & Nedělová, 2017), who found that structured cooperative physical activities promote social skills development, particularly cooperation and self-control. The improvement in social skills can be explained by the cooperative structure of Skillastics, where children communicate, cooperate, and take responsibility during group activities.

For motor skills, the findings are consistent with Gallahue's Hourglass (Goodway et al., 2019). At age 11, children are in the Application Stage of the Specialized Movement Phase, where locomotor, manipulative, and stability skills are integrated into increasingly complex movement combinations. Skillastics directly addresses this developmental stage by requiring simultaneous execution of running, throwing, catching, dribbling, balancing, and rolling within each card task. This multi-skill demand accelerates motor refinement in a manner consistent with meta-analytic evidence by Sun & Chen, (2024) and McDonough et al., (2020), confirming that structured sport-game interventions are effective for motor skill development in school-age children.

The significant interaction between intervention and location reveals that Skillastics was more effective in urban settings. Urban children, accustomed to structured, adult-facilitated activities, showed greater readiness to internalize the social and motor demands embedded in Skillastics. This interpretation aligns with Bronfenbrenner's ecological theory (Guy-Evans, 2025), which emphasizes the role of microsystem characteristics in shaping developmental

trajectories. Rural children, who showed smaller intervention-related gains, may have already developed social and physical competencies through unstructured outdoor play, reflecting a proximity-to-ceiling effect documented in rural developmental literature (Andrade Neto et al., 2014). Tejerina et al., (2025) similarly observed that urban and rural children respond differently to structured sport-based interventions, reinforcing the need to consider geographic context in program design.

The finding that urban children scored higher on both outcomes even after controlling for baseline ability extends previous work by Dheasari, (2020) and Awwaliyah, (2015) on urban-rural motor competence disparities. Zhang et al., (2025), using TGMD-3 and SSIS across children aged 3–10 years, further confirmed that object-control skill proficiency predicts social behavior at every developmental stage, providing additional theoretical support for the dual social and motor benefits observed in this study.

Collectively, these findings underscore that geographic context must be treated as an active moderator in the design and evaluation of physical activity interventions. While Skillastics proved effective across both settings, implementation strategies should be adapted to local conditions to maximize program benefits.

Conclusions

Skillastics significantly improved social skills and motor skills of 11-year-old children, with very large effect sizes on both outcomes. Urban children demonstrated higher scores and greater intervention-related gains compared to rural peers, indicating that while Skillastics is effective in both settings, its impact is moderated by geographic context. These findings support the integration of Skillastics into out-of-school physical activity programs at the elementary school level. Future research should employ randomized controlled trial designs with larger, geographically diverse samples and examine mediating variables such as intrinsic motivation, facilitator quality, and peer interaction quality to further explain differential responses across geographic contexts

This study was limited to 11-year-old elementary school children in Bandung Regency and implemented an eight-session intervention. Therefore, the findings should be interpreted within similar school contexts. Future studies should involve broader geographical areas and longer intervention periods.

In terms of research boundaries, this study was intentionally delimited to four public elementary schools selected through purposive sampling on the basis of BPS urban/rural classification, and did not extend to private schools, other age groups, or other provinces. The outcome variables were restricted to social skills and motor skills as measured by the SSIS and MOBAK 5-6 instruments; constructs such as cognitive development, academic achievement, and physical fitness were outside the scope of this study. Likewise, this study did not control for potential confounding variables such as household socioeconomic status, parental involvement, nutritional status, or out-of-school physical activity outside the Skillastics sessions, which were beyond the delimited scope of the present design. These boundaries were set to maintain a focused comparison between Skillastics' effects on social and motor outcomes across urban and rural elementary school settings, and they define the scope within which the present findings should be interpreted.

Acknowledgment

The authors gratefully acknowledge the participating schools, students, parents, and physical education teachers who facilitated this research.

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Cite this article as:

Indonesian Journal of Physical Education and Sport Science (IJPESS), 6(4), [PAGE RANGE TO BE CONFIRMED]. <https://doi.org/10.52188/ijpess.v6i4>