Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 4, October 2026 , Pg. 1433-1437
DOI: 10.35724/mjpes.v8i4.8066

Sprint Instruction and Changes in Motor Performance Among Grade Eight Students in Palembang

Bima Kesuma Herlambang[1], Muhammad Idris[1], Putri Cicilia Kristina[1*]

[1]Physical Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Palembang, Indonesia

Corresponding author: Putri Cicilia Kristina, E-mail: putrick@univpgri-palembang.ac.id

Abstract

Objectives: To examine changes in sprint technique and a composite motor performance score following sprint instruction among Grade Eight students at SMP Xaverius 1 Palembang.

Materials and Methods: This single-group pretest–posttest study included 30 students (17 boys and 13 girls) from one Grade Eight class. Sprint instruction addressed the crouch start, running mechanics, and finish over several lessons between January 19 and February 13, 2026. Teacher-rated sprint technique and a composite of strength, endurance, speed, agility, and flexibility were assessed before and after instruction. Paired observations from the original thesis were reanalysed using a paired t test for the motor score and a Wilcoxon signed-rank test for the sprint technique score.

Results: Mean sprint technique scores increased from 4.97 (SD 1.19) to 10.30 (SD 0.70), with a median within-student gain of 5 points (Wilcoxon $p < .001$). Mean motor scores increased from 8.40 (SD 1.45) to 16.57 (SD 1.87); the mean paired difference was 8.17 points (95% CI 7.31–9.03; $t[29] = 19.40$, $p < .001$). All 30 students improved on both scores.

Conclusions: Both recorded scores improved during the sprint instruction period. Because there was no comparison group and the scoring instruments require further validation, the changes cannot be attributed solely to instruction or interpreted as measured improvements in each fitness component.

Keywords: athletics; physical education; sprint technique; motor performance; adolescents

Introduction

Running is a basic locomotor skill and a familiar part of school physical education. Sprint lessons can give students repeated opportunities to practise starting, accelerating, coordinating arm and leg actions, and finishing. Motor competence and physical fitness are related, although measures of movement quality and measures of strength or endurance assess different constructs (Luz et al., 2017; Liu et al., 2023).

School-based movement interventions can improve children's locomotor skills, but their effects depend on what is taught and how outcomes are measured (Yin et al., 2025). Reviews also link fundamental movement skills with physical activity and fitness (Lubans et al., 2010; Cattuzzo et al., 2016; Barnett et al., 2016). Studies of adolescent interval running and sprint-based activities report gains in selected fitness outcomes, although

Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 4, October 2026 , Pg. 1433-1437
DOI: 10.35724/mjpes.v8i4.8066

protocols and populations vary considerably (Buchan et al., 2013; Costigan et al., 2015a; Martin-Smith et al., 2019).

Evidence from structured sport training cannot automatically be transferred to a regular school sprint lesson. For example, reviews of plyometric programmes report improvements in sprinting and jumping but examine a different training stimulus (Ramirez-Campillo et al., 2023; Zheng et al., 2025; Wu et al., 2025). The present study therefore describes changes in two teacher-recorded scores before and after sprint instruction in one Grade Eight class. Its purpose is to evaluate changes in sprint technique and the composite motor performance score, while distinguishing those observations from a causal treatment effect.

Materials and Methods

Study Design

A single-group pretest–posttest design was used. Data collection took place at SMP Xaverius 1 Palembang between January 19 and February 13, 2026. No control group, random assignment, or blinded outcome assessment was reported in the source thesis.

Study Participants

The sample comprised all 30 students in one participating Grade Eight class: 17 boys (56.7%) and 13 girls (43.3%). The thesis describes this as total sampling of that class; it does not establish that the class represents every Grade Eight student at the school. Participant ages and attendance by session were not reported.

Study Organization

Students completed a pretest, received instruction in sprint running, and then completed a posttest. The lessons covered the crouch start, running movement, and finishing technique. The source describes several meetings within the scheduled physical education period, approximately 120 minutes per meeting, but does not provide a reproducible session-by-session training dose.

Sprint technique was scored for the starting position, running movement, and finish. A separate composite motor score covered strength, endurance, speed, agility, and flexibility. The source does not clearly specify the task, unit, scoring anchor, or weighting for every component. Thus, the results below are rubric scores, not measured 100 m times or independent laboratory measures of fitness. The thesis reports Cronbach's alpha values of 0.389 for the sprint items and 0.555 for the motor items; these low values limit confidence in the score composites. No documented ethics approval or consent procedure was found in the source thesis and must be confirmed by the authors before submission.

Statistical Analysis

The 30 paired pretest and posttest values were extracted from the individual-level tables in the thesis and reanalysed. Means, standard deviations, paired differences, and 95% confidence intervals were calculated. Normality was assessed on within-person differences using the Shapiro–Wilk test. The motor difference was compatible with normality ($p = .110$) and was analysed with a paired t test. The sprint technique difference was less compatible with normality ($p = .041$) and was analysed with a two-sided Wilcoxon signed-rank test. All tests used $\alpha = .05$. The original independent-samples table and its $p = .040$ entry are inconsistent with the paired design and the listed individual scores; those values are not carried into this article.

Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 4, October 2026 , Pg. 1433-1437
DOI: 10.35724/mjpes.v8i4.8066

Results

All 30 students had a pretest and posttest score in each individual-level table. The descriptive results and paired analyses are presented in Table 1.

Table 1. Sprint technique and composite motor scores before and after instruction (n = 30)

Outcome	Pretest mean (SD)	Posttest mean (SD)	Mean gain (95% CI)	Paired test
Sprint technique score	4.97 (1.19)	10.30 (0.70)	5.33 (4.87–5.80)	Wilcoxon V = 0; p < .001
Composite motor score	8.40 (1.45)	16.57 (1.87)	8.17 (7.31–9.03)	t(29) = 19.40; p < .001

Note. Confidence intervals for mean gains are descriptive paired t intervals. The inferential test for sprint technique is Wilcoxon because its paired differences did not meet the Shapiro–Wilk normality criterion. Higher scores indicate better recorded performance; score ranges depend on the source rubric.

Sprint technique scores ranged from 3 to 7 before instruction and from 9 to 11 afterwards. Gains ranged from 3 to 8 points. All students recorded a positive gain, and the median paired gain was 5 points. The posttest standard deviation calculated from the individual scores is 0.70; the thesis narrative reports 1.702, which does not agree with its individual-level table.

Composite motor scores ranged from 6 to 12 at pretest and 12 to 19 at posttest. Gains ranged from 3 to 12 points, with an average increase of 8.17 points. The mean-based percentage increases calculated from the paired data are 107.4% for sprint technique and 97.2% for the motor score; percentages from different score scales should not be compared as intervention effect sizes. The 51.1% and 28.6% values in the original abstract do not follow from these individual scores.

Discussion

Students' recorded sprint technique and composite motor scores were higher after the instruction period. The gain in technique is consistent with repeated practice of starts, running mechanics, and finishes, although the rubric cannot separate learning from familiarity with the assessment. School-based programmes have produced gains in fundamental movement skills, lending plausibility to improvement during structured practice (Yin et al., 2025).

The motor score also increased, yet the evidence does not identify which of its five labelled components changed. Motor competence is associated with health-related fitness in children and adolescents (Luz et al., 2017; Liu et al., 2023; Behan et al., 2022), but an association does not validate this composite as a direct measure of strength, endurance, speed, agility, and flexibility. Studies using specified running or interval protocols have reported improvements in selected adolescent fitness outcomes (Buchan et al., 2013; Costigan et al., 2015b; Martin-Smith et al., 2019). Conversely, Williams et al. (2022) did not find across-the-board physical and cardiometabolic gains after a two-week school sprint programme. Together, these findings suggest that outcomes depend on the training dose and the measure selected.

Reviews of youth physical training find improvements in sprint performance after plyometric exercise (Ramirez-Campillo et al., 2023; Zheng et al., 2025; Wu et al., 2025). Such findings are useful context but do not demonstrate that the regular sprint lessons here caused the observed composite-score gains. More generally, systematic reviews have linked motor competence with fitness and activity, while noting variation in measures and intervention designs (Lubans et al., 2010; Cattuzzo et al., 2016; Barnett et al., 2016; Costigan et al., 2015a).

Interpretation is limited by the absence of a comparison class, the small sample from one school, the unclear scoring anchors, and low reported internal consistency for both rubrics. Maturation, other activity, assessor expectations, and repeat testing could contribute to the observed changes. Future studies should document session content and attendance, use validated and clearly scored component tests, record actual sprint times, and include a comparison group. Ethical approval and consent records should be documented in the submission version.

Conclusions

The 30 participating students had higher sprint technique and composite motor scores after a period of sprint instruction. The reanalysed paired results support a within-group change. Further controlled research with validated measures is needed to determine whether sprint instruction itself improves specific motor and fitness outcomes.

Acknowledgments

The authors may acknowledge the school and participants after confirming the appropriate permissions and preferred wording.

Conflict of Interest

Author declaration required before submission.

Funding

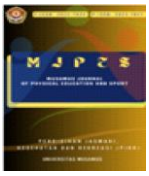
Funding information was not documented in the source thesis; author confirmation required before submission.

References

Barnett, L. M., Lai, S. K., Veldman, S. L. C., Hardy, L. L., Cliff, D. P., Morgan, P. J., ... Okely, A. D. (2016). Correlates of gross motor competence in children and adolescents: A systematic review and meta-analysis. Sports Medicine, 46, 1663–1688. https://doi.org/10.1007/s40279-016-0495-z

Behan, S., Belton, S., Peers, C., O'Connor, N. E., & Issartel, J. (2022). Exploring the relationships between fundamental movement skills and health related fitness components in children. European Journal of Sport Science, 22, 171–181. https://doi.org/10.1080/17461391.2020.1847201

Buchan, D. S., Ollis, S., Young, J. D., Cooper, S. M., Shield, J. P., & Baker, J. S. (2013). High intensity interval running enhances measures of physical fitness but not metabolic measures of cardiovascular disease risk in healthy adolescents. BMC Public Health, 13, 498. https://doi.org/10.1186/1471-2458-13-498



Cattuzzo, M. T., dos Santos Henrique, R., Ré, A. H. N., de Oliveira, I. S., Melo, B. M., de Sousa Moura, M., ... Stodden, D. (2016). Motor competence and health related physical fitness in youth: A systematic review. Journal of Science and Medicine in Sport, 19, 123–129. https://doi.org/10.1016/j.jsams.2014.12.004

Costigan, S. A., Eather, N., Plotnikoff, R. C., Taaffe, D. R., & Lubans, D. R. (2015a). High-intensity interval training for improving health-related fitness in adolescents: A systematic review and meta-analysis. British Journal of Sports Medicine, 49, 1253–1261. https://doi.org/10.1136/bjsports-2014-094490

Costigan, S. A., Eather, N., Plotnikoff, R. C., Taaffe, D. R., Pollock, E., Kennedy, S. G., ... Lubans, D. R. (2015b). Preliminary efficacy and feasibility of embedding high intensity interval training into the school day: A pilot randomized controlled trial. Preventive Medicine Reports, 2, 973–979. https://doi.org/10.1016/j.pmedr.2015.11.001

Liu, C., Cao, Y., Zhang, Z., Gao, R., & Qu, G. (2023). Correlation of fundamental movement skills with health-related fitness elements in children and adolescents: A systematic review. Frontiers in Public Health, 11, 1129258. https://doi.org/10.3389/fpubh.2023.1129258

Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (2010). Fundamental movement skills in children and adolescents: Review of associated health benefits. Sports Medicine, 40, 1019–1035. https://doi.org/10.2165/11536850-000000000-00000

Luz, C., Rodrigues, L. P., Meester, A. D., & Cordovil, R. (2017). The relationship between motor competence and health-related fitness in children and adolescents. PLOS ONE, 12, e0179993. https://doi.org/10.1371/journal.pone.0179993

Martin-Smith, R., Cox, A., Buchan, D. S., Baker, J. S., Grace, F., & Sculthorpe, N. (2019). Sprint interval training and the school curriculum: Benefits upon cardiorespiratory fitness, physical activity profiles, and cardiometabolic risk profiles of healthy adolescents. Pediatric Exercise Science, 31, 296–305. https://doi.org/10.1123/pes.2018-0155

Ramirez-Campillo, R., Sortwell, A., Moran, J., ... (2023). Plyometric-jump training effects on physical fitness and sport-specific performance according to maturity: A systematic review with meta-analysis. Sports Medicine - Open, 9, 23. https://doi.org/10.1186/s40798-023-00568-6

Williams, R. A., Dring, K. J., Morris, J. G., Sunderland, C., Nevill, M. E., & Cooper, S. B. (2022). Effect of two-weeks of school-based sprint training on physical fitness, risk factors for cardiometabolic diseases and cognitive function in adolescent girls: A randomized controlled pilot trial. Frontiers in Sports and Active Living, 4, 884051. https://doi.org/10.3389/fspor.2022.884051

Wu, H., Li, S., Lai, J., Bian, W., Ramirez-Campillo, R., Sáez de Villarreal, E., & Zhao, Q. (2025). Children's sprint and jump performance after plyometric-jump training: A systematic review. Journal of Sports Science and Medicine, 24, 52–74. https://doi.org/10.52082/jssm.2025.52

Yin, X., Zhang, D., Shen, Y., Wang, Y., Wang, Z., & Liu, Y. (2025). Effectiveness of school-based interventions on fundamental movement skills in children: A systematic review and meta-analysis. BMC Public Health, 25, 1522. https://doi.org/10.1186/s12889-025-22696-2

Zheng, T., Kong, R., Liang, X., Huang, Z., Luo, X., Zhang, X., & Xiao, Y. (2025). Effects of plyometric training on jump, sprint, and change of direction performance in adolescent soccer player: A systematic review with meta-analysis. PLOS ONE, 20, e0319548. https://doi.org/10.1371/journal.pone.0319548