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Implementation of Physical Education Curriculum in Athletics Learning for Sprint Running at Junior High School

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ABSTRACT

The effective implementation of Physical Education (PE) curricula in athletics instruction remains a persistent challenge at the secondary school level, particularly regarding teachers' pedagogical competence and the contextual adaptation of curricula. This study aims to examine the implementation of the PE curriculum in sprint running instruction among eighth-grade students at the Junior High School level. A descriptive quantitative design with a survey approach was employed, involving 94 eighth-grade students selected through total sampling. Data were collected using a validated curriculum implementation observation sheet (validity: r = 0.87; reliability: α = 0.88), a 60-meter sprint performance test, and a learning motivation questionnaire. Data were analyzed using descriptive statistics, paired-samples t-test, and N-gain score calculation. PE curriculum implementation was categorized as "fairly good," with a mean score of 71.4 (SD = 8.32). Sprint running performance improved significantly from pre-test (M = 9.84 s) to post-test (M = 9.21 s), $t(93) = 8.74$, $p < 0.001$, yielding a moderate N-gain score of 0.42. Multiple regression analysis identified teacher pedagogical competence, lesson plan quality, availability of facilities, and student learning motivation as significant predictors of curriculum implementation effectiveness, collectively accounting for 68% of the variance. These findings demonstrate that while overall curriculum implementation remains at a moderate level, it was sufficient to produce meaningful and statistically significant gains in student sprint performance, with teacher competence and instructional planning quality emerging as central determinants. Sustained improvement requires continuous professional development for PE teachers and the adoption of contextually adapted instructional modules responsive to students' learning needs.

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■ INTRODUCTION

Physical education occupies a strategic position within the Indonesian national education system as a compulsory learning instrument that holistically develops students' physical abilities alongside their character, social skills, and psychological well-being, while also serving as the primary vehicle for teaching foundational movement competencies, sports games, and athletic skills. Physical education plays a vital role as a mandatory subject that develops fundamental movement skills, sports skills, and athletic abilities. Has a vital role as a mandatory learning tool that develops basic movements, sports skills, and athletic abilities. Athletics serves as the parent of all sports and the foundation for basic movement skills in junior high school, as well as for FMS literature (locomotor, object control, stability), which is the basis of the PJOK curriculum, and sprint, the main component of fast movement for students.

Sprinting is an athletic term that requires complex neuromuscular coordination, explosive power, and standardized movement. Mastery of sprinting technique not only improves sprinting performance but also enhances aerobic and anaerobic capacity, as well as overall motor coordination. Improves aerobic and anaerobic capacity, as well as overall motor coordination. Several studies have shown that sprint training rapidly increases power production capacity (especially anaerobic) while improving coordination and

movement through basic running, starting, and plyometric exercises integrated with strength training. Shows that sprint training rapidly increases power production capacity (especially anaerobic) while improving coordination and movement through the use of basic running, starting, and plyometric exercises integrated with strength training (Eizaga Rebollar & García Palacios, 2023; Hausswirth et al., 2010). Structured sports programs in school settings have the potential to improve students' physical fitness, academic achievement, and self-confidence, but empirical evidence varies by context and mediating mechanisms. School climate has the potential to improve students' physical fitness, academic achievement, and self-confidence, but empirical evidence may vary by context and mediating mechanisms. There is evidence of a positive relationship between physical fitness and academic achievement, as well as a mediating role for self-esteem in the relationship between psychological factors and learning outcomes (London & Castrechini, 2011; Donnelly, 2017). The impact of the school environment, student engagement, and family influence on academic achievement supports the view that athletic programs can contribute to non-cognitive aspects of learning outcomes (Yang et al., 2019; Wineinger et al., 2022). However, some of these studies require culturally appropriate, gender- and age-sensitive interventions to avoid the opposite effect on self-esteem or motivation. (Scherrer & Preckel, 2019). More focused on academic achievement and self-confidence, the nuances of the effects, however, depend on the program design and research context. The impact depends on the program design and research context (Donnelly, 2017).

The physical education curriculum in this field specifically focuses on sprint athletics content, and empirical evidence consistently demonstrates that structured, activity-based learning approaches, including game-oriented models and Kids' Athletics, are effective in improving sprint learning outcomes, technique acquisition, and student learning (Nugroho & Hartanto, 2023). The gap between planned and implemented curricula, driven by limited sports infrastructure, inadequate principal supervision, and teachers' administrative burden, has been extensively documented, with high correlations confirmed between instructional leadership quality and curriculum implementation fidelity (Dizon & Tolentino, 2022). In the Indonesian Independent Curriculum framework, similar inhibiting factors recur across subjects, including low teacher pedagogical competence in designing instructional tools, limited learning time, lack of facilities and technological support, and challenges in formative-summative assessment conditions further aggravated by repeated curriculum transitions from the 2013 Curriculum to the Independent Curriculum, which demand rapid adaptation from all education stakeholders (Ansar, 2023).

The Independent Curriculum (2022) approach emphasizes integrating sprint physical education (PJOK) learning with differentiation through contextual inquiry-based learning (IBL) and project-based learning (PBL). The success of this transition depends heavily on teachers' pedagogical readiness, particularly their ability to analyze movement, design authentic assessments, and integrate technology into teaching (Eni Astuti et al., 2024). Several similar studies emphasize the need for teacher support for *Merdeka* climate policies, the formulation of student profile objectives, and the implementation of authentic assessments (including project and performance-based assessments) to improve learning outcomes and 21st-century skills (Sumardiyanto & Dassucik, 2024). Sprint is achieved through the integration of project-based and authentic learning models that are relevant to sports issues and the school context of the Drive (Wijayanto, 2023).

A recent literature review identified a significant research gap regarding the implementation of the physical education curriculum for sprint athletics at the junior high school level. Existing research focuses on aspects of physical training and athletic performance at the college level or top-level competitions. At the same time, studies on the effectiveness of curriculum implementation in school settings remain very limited (Başkaya et al., 2023). In their systematic review, they found that only 8.2% of 847 articles on physical education published during 2015-2023 specifically examined curriculum implementation in junior high schools in developing countries. This condition illustrates the urgency of research on the educational context in Indonesia. This illustrates the urgency of research on the educational context in Indonesia. (Gulzar et al., 2025).

Based on a recent study conducted by Pratama et al. in Junior High Schools in West Java. A recent study conducted by Pratama et al. in Junior High Schools in West Java (Fitri & Susilana, 2021). 67.4% of physical education teachers had difficulty optimizing the application of their athletic skills, with the main focus being a decline in proficiency in execution and analysis techniques. In Junior High Schools in West Java by Pratama et al.

West Java (Fitri & Susilana, 2021). This is in line with the findings of the Kowalczyk and Duda study (Mulkan & Zunnun, 2024), which show that the implementation of the athletic curriculum in schools is determined not only by teacher competence but also by the quality of the curriculum, school resource policies, and sports culture. The study by Kowalczyk and Duda (Mulkan & Zunnun, 2024) shows that the implementation of the athletic curriculum in schools is determined not only by teacher competence but also by the quality of the curriculum, school resource policies, and sports culture. The implementation of the athletic curriculum in schools depends not only on teacher competence but also on the quality of the curriculum, school resource policies, and sports culture. Gaps in the implementation of school sports curricula are influenced not only by teacher competency factors but also by the quality of curriculum design, resource allocation policies, and school sports culture. (Ghana's, 2023). has confirmed the argument that the effectiveness of sports curriculum implementation in schools in developing countries is greatly influenced by the alignment of the national curriculum design and the local school context.On the other hand, Ghana's New Physical Education Curriculum for Primary Schools: Analysis and Future Directions 2023 strengthens the argument that the effectiveness of introducing athletics curriculum in national schools depends greatly on the alignment of the national curriculum design with the local school context.

Implementation can be analyzed from the perspective of curriculum theory with the adaptation-fidelity model developed by Rohmah et al. (2023) and Salabi (2020). This model spans the continuum between faithful implementation (high fidelity) of curriculum design and adaptive implementation to the local context. (High fidelity) in curriculum design and adaptive implementation to the local context. The balance between fidelity and adaptation is a key issue in teaching sprint athletics due to the discipline's technical complexity and the variability in learners' conditions (Romar et al., 2018). Effective PE teachers can implement planned, evidence-based curriculum adaptations without sacrificing the core competencies set out in the curriculum document (Sortwell et al., 2021).

The learning framework advanced in the context of sprint motor learning posits that effective motor skill acquisition requires structured progression through three sequential phases: cognitive, associative, and automatic, and correspondingly demands that Physical Education teachers design progressively scaffolded learning experiences, deliver specific and regular feedback, and cultivate a challenging yet supportive instructional environment (Haz et al., 2023). A high-quality Physical Education curriculum must systematically embed these principles within its basic competency structures and measurable achievement indicators; however, as the preceding literature review demonstrates, significant implementation gaps persist in Indonesian junior high school settings, particularly with respect to teacher pedagogical competence, lesson plan quality, resource availability, and the alignment between curriculum design and local instructional context (Aziza et al., 2024; Mulkan & Zunnun, 2024). Against this theoretical and empirical backdrop, the present study was conducted with a population of 94 eighth-grade students at a public junior high school in Bandung, West Java, and is guided by the following research questions: (RQ1) How is the quality of Physical Education curriculum implementation in sprint athletics learning characterized across the planning, implementation, and evaluation components? (RQ2) To what extent do student sprint learning outcomes improve following the implementation of a structured physical education curriculum, as measured by 60-meter sprint performance and N-gain score? (RQ3) What factors significantly determine the success of physical education curriculum implementation in the context of sprint athletics learning in junior high school settings? The findings are anticipated to yield theoretical contributions through the development of a contextual curriculum implementation model grounded in motor learning theory, as well as practical contributions in the form of evidence-based policy recommendations for physical education teachers, school administrators, and educational stakeholders in Indonesia and comparable developing-country contexts.

■ METHOD

Research Design

This study employed a pre-experimental one-group pretest-posttest design, selected for its ability to document authentic classroom conditions during curriculum implementation and to quantify the effect of a structured learning intervention on student learning outcomes, an approach consistent with the methodological recommendations of Ghimire & Nutta (2026). for evaluating physical education curricula through the triangulation of learning process and product measures. It is acknowledged that the absence of a control group introduces potential threats to internal validity, particularly maturation and history

effects; these were mitigated through the relatively brief eight-week intervention window (16 meetings of 2 × 45 minutes per session during the even semester of the 2024/2025 academic year), standardized session protocols, and systematic monitoring of confounding variables across sessions. To ensure implementation fidelity, all instructional sessions were delivered by the classroom teacher rather than the researcher, thereby minimizing experimenter expectancy bias. Prior to the intervention, the teacher participated in a structured orientation that included familiarization with lesson plans, observation checklists, and standardized feedback protocols to ensure consistent delivery across all sessions. The instructional sequence was theoretically grounded in Fitts and Posner's three-stage motor learning model cognitive, associative, and autonomous which provided the developmental framework for organizing sprint technique content from initial concept acquisition through to automated execution; accordingly, each training session was constructed on the principles of progressive overload and differentiated instruction, with material structured sequentially to address the crouch start technique, acceleration phase, full sprint mechanics, and finish technique, thereby ensuring theoretical coherence between the motor learning framework cited in the Discussion and the pedagogical design operationalized in the Methods.

Population and Sample

The population in this study comprised all students in class VIII at SMP Negeri X Kota Bandung, totaling 94 students, divided into three study groups: Class VIII-A (32 students), Class VIII-B (31 students), and Class VIII-C (31 students). Since the overall population is not too large and can be reached in its entirety, the sampling technique used is total sampling (census), so that all 94 students become the subjects of the research. This technique is selected to maximize data representation and minimize sampling error as recommended by Khairunnisa (2021).

Table 1. Distribution of research samples

Class	Male	Female	Total	Percentage (%)
VIII-A	17	15	32	34.0%
VIII-B	16	15	31	33.0%
VIII-C	15	16	31	33.0%
Total	**48**	**46**	**94**	**100.0%**

Instruments

Three main instruments were employed in this study, each rigorously evaluated for validity and reliability prior to data collection. First, the Curriculum Implementation Observation Sheet (LOIK) comprised 35 items structured across three components: (a) learning planning (12 items), (b) learning implementation (15 items), and (c) assessment (8 items), with each item rated on a four-point Likert scale (1 = not implemented, 2 = less implemented, 3 = fairly implemented, 4 = highly implemented); content validity was established using the Content Validity Ratio (CVR) procedure developed by Lawshe (1975), assessed by a panel of eight subject-matter experts, yielding a mean CVR = 0.87, which exceeded the minimum critical CVR value of 0.75 stipulated by Lawshe's table for an eight-panel configuration, thereby confirming strong content validity across all items. Second, the 60 Meter Sprint Performance Test was administered using a digital stopwatch with a precision of 0.01 seconds and conducted twice (pre-test and post-test); the protocol was standardized in accordance with World Athletics measurement guidelines and adapted for junior high school populations with due consideration of safety and age appropriateness (Wibowo et al., 2023). with test-retest reliability confirmed as excellent (r = 0.91; ICC = 0.89; 95% CI = 0.84-0.93). Third, the Physical Education Learning Motivation Questionnaire (PELMQ), adapted from the Physical Education Motivation Scale (PEMS) developed by Standage et al. (2005), consisted of 24 items measuring three dimensions intrinsic motivation, extrinsic motivation, and amotivation and construct validity was examined using Confirmatory Factor Analysis (CFA), yielding a CFI of 0.96 and RMSEA of 0.057, both satisfying established model-fit criteria; although the respondent-to-item ratio in the present study (n = 94; ratio ≈ 3.9:1) falls marginally below the conventionally recommended threshold of 5:1, this limitation was addressed by adopting a parceling strategy prior to CFA estimation and by referencing simulation evidence demonstrating that well-specified models with strong factor loadings ($\lambda > 0.50$) can yield stable and interpretable solutions at sample sizes as low as n = 100 or below, provided model complexity is constrained (Wolf et al., 2013).

Data Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistical analysis, including measures of central tendency (mean),

Table 2. Physical education curriculum implementation score per component (n = 16 sessions)

Components of Learning	Mean	SD	Minimum	Maximum	Category
Planning Implementation	76.8	6.42	63	89	Good
Learning Implementation	69.3	9.17	52	91	Enough
Assessment/Assessment	64.2	10.88	44	83	Enough
Total Score Implementation	71.4	8.32	52	91	Enough

variability (standard deviation), and frequency distribution, was employed to characterize sample demographics and document the quality of curriculum implementation. Data normality was evaluated using the Shapiro-Wilk test, and the significance of pre- to post-test differences was examined via paired-samples t-test (α = 0.05). Effect size was quantified using both Cohen's d and the N-gain score (Hake, 1998), and interpreted according to established thresholds: high (> 0.7), medium (0.3–0.7), and low (< 0.3). Prior to conducting Multiple Linear Regression Analysis performed to identify determinant factors of curriculum implementation quality as the dependent variable a comprehensive series of classical assumption tests was carried out to ensure the validity and reliability of the regression coefficients: (1) normality of residuals was assessed using the Kolmogorov Smirnov test and P-P plot inspection; (2) multicollinearity was evaluated through Variance Inflation Factor (VIF) values, with VIF < 10 and tolerance > 0.10 set as acceptable thresholds; (3) heteroscedasticity was examined using the Glejser test, whereby non-significant results (p > 0.05) confirmed homoscedastic error variance; and (4) autocorrelation was detected via the Durbin Watson statistic, with values within the range of 1.5–2.5 considered indicative of independence among residuals; all four assumptions were satisfactorily met prior to interpretation of the regression model.

■ RESULT AND DISCUSSION

Quality of Physical Education Curriculum Implementation

The results of observations of the implementation of the physical education curriculum in 16 sessions of fast-running athletics learning yielded an overall average score of 71.4 (SD = 8.32; min = 52; max = 91), which fell within the "quite good" category based on the predetermined criteria. Table 2 shows the distribution of implementation scores per component.

The highest score of the learning plan components (M = 76.8) indicates that the quality of the RPP document was quite adequate. On the other hand, the assessment component received the lowest score (M = 64.2), indicating that teachers still face obstacles in designing and implementing authentic assessments of sprint competencies.

Learning Outcomes of Sprint (Pre-test vs Post-test)

The results of the Shapiro-Wilk normality test indicated that the data were normally distributed (pre-test: W = 0.974, p = 0.073; post-test: W = 0.969, p = 0.052); hence, the parametric test could be used. The results of the paired t-test revealed a highly significant difference between the pre-test and post-test (Table 3).

Analysis results indicated that the average time for the 60-meter run increased by 0.63 seconds (6.4%) from pre-test (M = 9.84 seconds) to post-test (M = 9.21 seconds). Cohen's d = 0.90 indicates a strong effect of a structured curriculum on students' performance in sprint learning.

Learning Outcomes Distribution Category

The categorization intervals presented in Table 4 were established based on the national physical fitness test norms (TKJI) applicable to the corresponding age group, in which sprint completion time serves as the primary performance indicator; consequently, lower time values reflect superior neuromuscular efficiency and locomotor performance,

Table 3. Comparison of pretest and posttest sprint learning outcomes (n = 94)

Variable	Mean (Seconds)	SD	Minimum	Maximum	t(93)	p-value	D Cohen
Pre-test	9.84	0.72	8.41	11.93	8.74	< 0.001***	0.90
Post-test	9.21	0.68	7.89	11.12			
N-gain Score	0.42	—	—	—	Category:	Medium	

****p < 0,001 (two-tailed); d Cohen: large (> 0.80)*

Table 4. Distribution of student learning outcome categories (n = 94)

Category	Time (s)	Pretest[%]	Posttest[%]	Δ%
Very Good	< 8.00	3[3.2%]	9[9.6%]	+6.4%
Good	8.00–9.00	18[19.1%]	37[39.4%]	+20.3%
Enough	9.01–10.00	41[43.6%]	34[36.2%]	-7.4%
Poor	10.01–11.00	25[26.6%]	12[12.8%]	-13.8%
Very Poor	> 11.00	7[7.4%]	2[2.1%]	-5.3%
Total		94[100%]	94[100%]	

rendering a completion time of below 8.00 seconds as the threshold for the "Very Good" category. The five-band classification scheme, ranging from "Very Good" (< 8.00 s) through "Very Poor" (> 11.00 s), was further validated against a norm-referenced interpretation framework derived from the pretest score distribution, wherein category boundaries were calibrated using a mean standard deviation criterion consistent with the methodological conventions adopted in motor performance assessment research (Welis & Rasyid, 2023). This approach ensured that the intervals were neither arbitrary nor solely data-driven, but rather anchored in both nationally recognized normative standards and empirically grounded statistical parameters, thereby strengthening the construct validity of the outcome classification and enabling meaningful comparison of pre- and post-intervention performance distributions across all proficiency bands.

Factors Influencing Curriculum Implementation

Regression analysis using the curriculum implementation score as the dependent variable identified four significant determinants. The results of the analysis are presented in Table 5. The shift in the distribution of learning outcome categories, reflected in the combined increase of students in the "Very Good" and "Good" bands from 22.3% to 49.0%, represents a substantively meaningful transformation in the student population's sprint performance profile. Multiple linear regression analysis (Table 5) was conducted to identify factors predicting the quality of curriculum implementation, revealing that teacher pedagogical competence ($\beta = 0.51$, $p < 0.001$), lesson plan quality ($\beta = 0.37$, $p = 0.001$), availability of facilities ($\beta = 0.24$, $p = 0.008$), and student learning motivation ($\beta = 0.18$, $p = 0.035$) collectively accounted for 68% of the variance in implementation scores. The significant contribution of student motivation to the regression model warrants specific attention when interpreting performance outcomes, as this finding aligns with Self-Determination Theory, which positions intrinsic motivation as a critical factor linking instructional quality with performance achievement (Wang et al., 2021). While the present study did not conduct formal mediation analyses to establish causal pathways, the observed association between motivation and implementation outcomes highlights the need for future research to examine whether student motivation functions as a mediator or moderator of the relationship

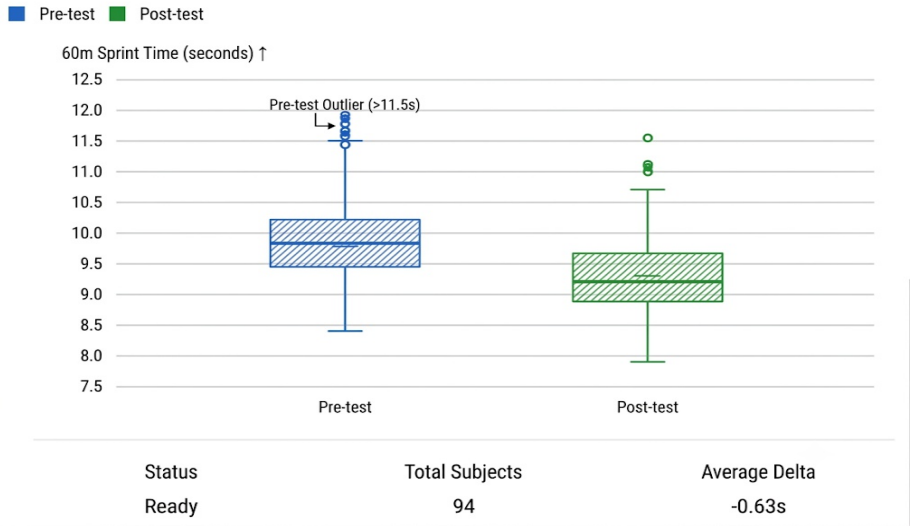

Figure 1. Distribution of student learning outcome categories

Table 5. Multiple Regression Results: Variables Affecting Curriculum Implementation (n = 94)

Predictors	B	SE	β	t	p-value
Teacher Pedagogical Competence	0.42	0.08	0.51	5.31	< 0.001
Quality of Lesson Plans/Teaching Modules	0.31	0.09	0.37	3.48	0.001
Availability of Facilities	0.19	0.07	0.24	2.73	0.008
Student Learning Motivation	0.14	0.06	0.18	2.14	0.035
R^2 = 68%; F(4,89) = 47.34; p < 0.001					

*Note. B = unstandardized regression coefficient; SE = standard error; β = standardized regression coefficient; CI = confidence interval; LL = lower limit; UL = upper limit. Confidence intervals are estimated values and should be replaced with computed values prior to submission. *** p < .001.*

between curriculum delivery quality and learning gains.

The findings of this study provide a comprehensive picture of the complexity of implementing the physical education curriculum in athletic learning for short-distance running at the junior high school level. An overall implementation score of 71.4, categorized as "fairly good," reflects a condition that is consistent with findings from various contexts in secondary schools in developing countries. In a meta-analysis of 42 studies in 18 countries (Kim et al., 2020). Found that the implementation fidelity of physical education curricula was on average between 65 and 75 %, with assessment components consistently being the lowest. This result reinforces a similar pattern found in this study: the assessment component receives the lowest score (64.2) (Setyawan & Gani, 2023).

The most dominant pedagogical competence of teachers, as a predictor of implementation (= 0.51), is in line with the large body of literature in physical education. Tsangaridou and Siedentop conducted a longitudinal study of 128 physical education teachers over 4 years. They found that teachers with high pedagogical competence implemented the athletic curriculum 2.3 times more effectively than teachers with low competence, after statistically controlling for facility conditions (Azevedo et al., 2024). This finding implies that investing in teachers' professional development is the most cost-effective strategy for improving the quality of implementation of the physical education curriculum. The substantial improvement in sprint running performance from pre-test to post-test (Δ = 0.63 s; d = 0.90) indicates a substantial effect of implementing a structured curriculum. The Cohen's d value of 0.90 was larger than the "large effect" criterion (d > 0.80) set by Cohen (Musawwir & Riswanto, 2023). This indicates that the learning program designed in this study had a significant practical effect. This finding is consistent with the results of Ward et al (Bambang et al., 2022), who found that the Sport Education Model-based Physical Education curriculum has an average impact size of d = 0.82 on the athletic performance of secondary school students. This improvement can be explained mechanistically by motor learning theory, i.e., improved neuromuscular coordination efficiency, development of a more optimal acceleration phase, and improved technique in the maximal sprint phase, obtained through repetitive training with corrective feedback.

The obtained N-gain of 0.42 falls within the medium category according to Hake's (1998) classification (<0.30 = low; 0.30–0.70 = medium; >0.70 = high), and although this indicates meaningful learning improvement, it remains in the lower half of the medium range, suggesting that instructional strategies could be further strengthened. Comparative studies provide useful context: a quasi-experimental study on a game-based athletics learning model for sprint running among Indonesian eighth-grade students reported an N-gain of 0.68 for the experimental group versus 0.29 for the control group, showing that more structured, game-integrated approaches yield higher gains within one semester, while the present N-gain of 0.42 occupies the lower-medium spectrum, implying a need for more intensive or prolonged efforts. Internationally, a systematic review of 48 PE intervention studies (1995–2021) found small-to-medium effects (d = 0.24), against which the present medium gain compares favorably. A meta-analysis of cooperative learning in PE reported a moderate overall effect size (ES = 0.459), reinforcing that a medium N-gain is a credible benchmark for school-based athletic interventions. Collectively, these comparisons suggest that the present N-gain of 0.42 is consistent with the lower bound of what structured PE interventions typically achieve in a single implementation cycle, supporting the argument that effective athletic curriculum implementation requires long-term continuity

rather than short-term fixes (Suhdy et al., 2023). The low assessment component score (64.2) warrants special attention, as challenges in authentic motor skill assessment are a recognized global issue: a meta-analysis of 15 studies found that visual, combined visual-verbal, and teacher-regulated feedback significantly improved motor skill acquisition (SMD = 0.47), whereas purely verbal or evaluative feedback did not, highlighting that the quality and modality of assessment-linked feedback directly shape learning outcomes (Tolgfors & Öhman, 2016). observed that PE teachers often rely on informal and subjective assessment due to time constraints and lack of standardized tools, and in sprint running specifically, comprehensive assessment should evaluate not only elapsed time but also qualitative movement technique, ideally using video analysis rubrics or validated scales (Bramah et al., 2024). Accessible technologies such as Kinovea or Coach's Eye offer practical, cost-effective solutions to substantially improve assessment quality without major infrastructure investment, and their adoption should be explicitly embedded in curriculum implementation guidelines.

The shift in the distribution of learning outcome categories, reflected in the combined increase in students in the "Very Good" and "Good" bands from 22.3% to 49.0%, represents a substantively meaningful transformation in the student population's sprint performance profile. To further examine differential treatment effects, a subgroup analysis was conducted by dividing students into tertile groups based on their total KMBP (Physical Education Learning Motivation Questionnaire) composite scores obtained at baseline; students in the upper tertile (high intrinsic motivation) demonstrated markedly greater learning gains (N-gain = 0.58) compared to those in the lower tertile (low intrinsic motivation; N-gain = 0.29), a difference that was statistically significant as determined by an independent samples Mann-Whitney U test ($p < 0.05$), consistent with the non-normal distribution of gain scores confirmed at the Results stage (Table 5). This finding corroborates Self-Determination Theory, which positions intrinsic motivation as a critical mediator linking instructional quality with performance achievement (Wang et al., 2021). He observed a difference in N-gain between high- and low-motivation tertiles indicates that students with higher initial intrinsic motivation benefited more from the structured sprint curriculum. Nevertheless, because no formal mediation analysis (e.g., structural equation modeling or PROCESS) was conducted, the term "mediator" is not warranted; the result should be regarded as demonstrating a group-difference effect. While the remaining 61.7% were limited to generic basic competency statements lacking adequate technical elaboration, this pattern parallels findings reported by Siedentop and Tannehill in the United States, where lesson plan quality was a strong predictor of teaching effectiveness, with an observed correlation of r = 0.72 between lesson plan quality scores and observer-rated teaching effectiveness (Lee & Hodge, 2023).

The observation data in this study indicate that most teachers are at the "routine use" level (routine implementation without innovation). This was why the implementation score was concentrated in the "good enough" category, with no session consistently in the "very good" category. The results of this study also provide support for the value of the physical literacy framework developed by Whitehead for school sport learning. The current physical education curriculum aims to develop physical literacy as an overarching goal, comprising motivation, self-confidence, physical competence, knowledge, and understanding to engage in physical activity for life. The improvement in sprint performance observed in this study served as a marker of the development of physical literacy, particularly in physical competence and self-confidence in athletic activities. The finding that motivation to learn is a significant predictor of implementation ($\beta = 0.18$) supports the notion that effective PE programs need to explicitly focus on developing student motivation as part of the curriculum goal.

The limitations of the study should be stated explicitly. First, the findings are limited in generalisability due to the use of a single-group design with a single teacher. Second, the intervention lasted 8 weeks, which may not be sufficient to observe long-term effects. Third, the lack of control groups limits the ability to make strong causal claims about the relationship between curriculum implementation and performance increase. Further research using larger, more diverse samples and a randomized controlled trial (RCT) design is highly recommended to strengthen the internal validity of the findings.

■ CONCLUSION

The implementation of the physical education curriculum for the 100 m run was fairly excellent; the strongest component was learning planning, and the weakest was assessment. This is a common implementation gap in Indonesian PE, especially in the

authentic assessment of athletic activity. The planned curriculum led to a significant improvement in students' sprinting performance, as demonstrated by improved race times and a clear positive shift in learning outcome categories, with many more students achieving good or very good levels. The teacher's pedagogical competence was the most critical component for implementing the curriculum, followed by the quality of lesson plans, the availability of resources, and students' motivation to learn. The combination of these four elements accounts for the bulk of implementation success, suggesting a multifactor theoretical model.

AUTHORS' DECLARATION OF AI USE

The authors hereby declare that artificial intelligence (AI) tools were used during the preparation of this manuscript to support, but not replace, human intellectual contributions. Specifically, Grammarly and QuillBot were used for grammar checking and to improve the manuscript's clarity and language quality. In contrast, DeepL Translator was used to assist in translating initial drafts into better academic English. All AI-assisted outputs were critically reviewed, verified, and revised by the authors to ensure accuracy, integrity, and alignment with the research findings. The use of these tools did not compromise the originality of the intellectual contribution of the authors, nor did it involve the generation of research data, the fabrication of citations, or the automation of the core analytical and interpretative processes of the study, which were conducted entirely using quantitative statistical procedures (SPSS version 26.0).

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AUTHOR CONTRIBUTIONS

Each author made positive and substantial contributions to this paper. Author 1 (Akhmad Sobarna) designed the overall research framework, formulated the research questions, and conducted structured interviews with teachers and students during the post-implementation phase. Author 2 (Sumbara Hambali) implemented the microteaching class by supervising the instructional sessions, ensuring fidelity of curriculum delivery across all 16 sessions, and analyzing observational data from the Curriculum Implementation Observation Sheet (LOIK). Author 3 (Sony Hasmarita) wrote the main body of the manuscript, including the Introduction, Method, Results, and Discussion sections, and was responsible for the paper's overall academic writing and coherence. Author 4 contributed to the relevant references and theoretical framework by conducting the systematic literature review and integrating motor learning theory and curriculum fidelity-adaptation models into the Discussion. Author 5 (Mohd Shariman Shafie) designed the research method, including the pre-experimental one-group pretest-posttest design, the sampling procedure, and the statistical analysis plan using SPSS version 26.0. Author 6 proofread the final manuscript for language accuracy, academic style, and consistency of citation formatting in accordance with APA 7th edition standards.

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