Journal of Comparative Education Nexus
Vol. 1 No. 4, October 2026, pp.208-220 | ISSN: 3163-5636
https://journal.gioedutech.id/index.php/jcen/issue/view/

Building students' WASAKA character and muscle strength through the integration of the direct instruction model and practice style

Hernita Warusni[1]*, Mashud[1], Muhammad Fadillah[2], Pebriyandi[2]
[1]Universitas Lambung Mangkurat, Indonesia
[2]Muhammadiyah Martapura Elementary School, Indonesia

***Corresponding Author:** hwarusni@ulm.ac.id

ABSTRACT

Physical education plays a strategic role in shaping students' character and physical, but practices in the field are still largely dominated by conventional approaches that are less effective in optimally instilling values of resilience. The local value of "WASAKA" (Waja Sampai Kaputing), which reflects a never-give-up attitude, discipline, and responsibility, is considered relevant to be integrated into physical education learning to strengthen students' character in facing contemporary challenges. This study aims to examine the effectiveness of integrating the Direct Instruction and Practice Style models in fostering the WASAKA attitude and improving the muscle strength of elementary school students. The study employed a quantitative approach using a quasi-experimental pretest–posttest control group design, involving 80 students from two elementary schools in Banjar Regency who were divided into experimental and control groups. The instruments used included a WASAKA attitude questionnaire and muscle strength tests consisting of push-ups, sit-ups, and vertical jumps. Data were analyzed using descriptive statistics, normality and homogeneity tests, as well as inferential statistical tests, including the paired t-test, Wilcoxon test, independent t-test, Mann–Whitney test, and simple linear regression. The results revealed a significant increase in both WASAKA attitude scores and muscle strength among students in the experimental group compared to those in the control group ($p < 0.05$). However, the linear regression analysis indicated that there was no statistically significant relationship between WASAKA attitude and students' muscle strength ($p>0.05$). In conclusion, the integration of the Direct Instruction and Practice Style models proved effective in improving physical education learning outcomes in terms of both character development and physical fitness, although the two variables did not directly influence one another. This model is therefore recommended as an innovative learning approach to support the integrated development of students' character and physical fitness.

Keywords: WASAKA attitude; physical education; muscle strength; instruction model; practice style.

Article history

Received:	*Revised:*	*Accepted:*	*Published:*
Date 17/08/2026	*Date 10/09/2026*	*Date 20/10/2026*	*Date 30/10/2026*

Citation (APA Style): Hernita Warusni et al. (2026). Building students' WASAKA character and muscle strength through the integration of the direct instruction model and practice style. Journal of Comparative Education Nexus, 1(4), pp. 174-438.

INTRODUCTION

In facing the challenges of globalization, individuals who are physically and mentally strong are needed. To address these challenges, a superior and competitive generation is essential. Building such a generation requires various efforts, both through education and support for local wisdom values that can shape students' character. However, there is still limited research integrating learning models with local wisdom-based character values to foster student character development. Therefore, this research is important in determining the extent to which character values can be achieved through innovative and integrated physical education learning models.

In South Kalimantan, there is a motto, "Waja Sampai Kaputing" (WASAKA), which describes a never-ending struggle and an unyielding spirit. This motto is relevant to the need to address the challenges of globalization. In terms of education, it cannot be denied that physical education is more than just physical activity as it can be a strategic means of character building and development (Warni & Rubianti, 2018; Sianturi & Nababan, 2026). The values of WASAKA include perseverance, confidence, discipline, and responsibility (Sarbaini et al., 2012). If these values are integrated into the physical education learning process, they will support the formation of students' strong character.

Previous studies from Mutia et al. (2019), Ridha & Warni, (2024), and Sari et al., (2024) show that physical education contributes to the students' character building, both individually and in the community. Fadillah et al. (2025) states that the WASAKA character philosophy (Waja Sampai Kaputing) plays a role in the persistence of South Kalimantan soccer athletes. The values are in line with the concept of "grit," as proposed by Douckworth (2016), which emphasizes perseverance and passion for achieving long-term goals, and are further supported by Shukla (2017), who states that students with high levels of grit are better able to face challenges and achieve success. The integration of WASAKA values in physical education is considered capable of enhancing students' fighting spirit and mental resilience, which aligns with the objectives of education according to UURI (2003), namely, to develop individuals who are faithful, possess noble character, are healthy, capable, creative, and responsible. The contribution of WASAKA values is also considered to support the vision of developing high-quality human resources to realize Indonesia Emas 2045.

The urgency of this research lies in the importance of innovating physical education learning models that can solve student character problems, by promoting WASAKA values as innovative solutions to strengthen mental resilience and create a positive and inclusive school environment. However, the WASAKA attitude, which reflects resilience and persistence, is often not optimally integrated into physical education learning. Although Pebriyandi et al. (2025) has examined the development of student independence, WASAKA values not only include independence but also other aspects that have not been fully explored. Nuraini et al. (2024) highlights the gap between ideal condition and actual practice, where physical education learning is still focused on technical and physical skills, while neglecting the affective aspects. Ihwanto et al. (2022) also criticize conventional teaching methods, arguing that they often make students feel bored and unmotivated. This study further highlights students' weak muscle strength, based on observations from physical fitness activities, which indicate suboptimal learning outcomes resulting from limited exploration and lack of initiative in the learning process.

Learning innovations that harmoniously combine cognitive, affective, and psychomotor aspects are needed so that students not only acquire skills but also experience positive character development (Naro & Gani, 2023). The integration of the Direct Instruction Model and Practice Style offers a promising solution, where Direct Instruction provides structure and clarity of concepts and basic skills (Arifin, 2023; Sianturi et al., 2026), while Practice Style encourages independent practice, creativity, and learning responsibility (Mosston & Ashworth, 2008; Nurhasanah et al., 2024). This combination is expected to create a meaningful and enjoyable learning experience, encouraging active participation and optimal learning outcomes. In the context of physical education, the target is not only to improve physical skills but also to build strong character. The WASAKA values, which reflect persistence, a never-give-up spirit, discipline, and responsibility, are strongly relevant to this approach. Direct Instruction helps students systematically understand targeted exercises to build muscle strength, while Practice Style allows students to face challenges independently and develop a strong fighting spirit. Schematically, the researchers have summarized the integration of the two models in Table 1 and Figure 1.

This study aims to address the challenges in physical education learning through the integration of two learning models to improve learning outcomes in physical activity and foster WASAKA attitude. The research problem focuses on how WASAKA attitude can be developed and students' muscle strength enhanced through the integration of the Direct Instruction Model and Practice Style. The approach employs experimental research, allowing for direct intervention and systematic observation of its impact. Enhancing muscle strength and fostering positive attitudes such as WASAKA represent two important domains in physical education learning.

Various studies show the effectiveness of structured instruction approaches such as Direct Instruction in improving basic motor skills and physical fitness (Khairuddin et al., 2022; Sierra-Ríos et al., 2020), as well as teaching styles such as Practice Style in increasing active engagement, number of repetitions, and learning autonomy (Rohmansyah et al., 2022; Ross & Pascale, 2020). Other studies also emphasize the importance of innovative strategies for shaping character traits such as resilience and social responsibility (Bronikowska et al., 2024; Fajri et al., 2025), and weight training interventions for muscle strength (Robinson et al., 2023). Mustapha et

Copyright © 2026 JCEN, *Hernita Warusni*

al. (2019) also highlights the effectiveness of plyometric exercises in improving muscle strength and speed. Although various studies have examined the effectiveness of Direct Instruction and Practice Style separately, no research has specifically integrated these two models to improve students' WASAKA attitude and muscle strength. The novelty of this study lies in the specific integration of both models to foster WASAKA attitude within the context of physical education while simultaneously measuring the impact of this innovation on students' muscle strength, thereby providing empirical evidence regarding the effectiveness of the proposed method.

Table 1. Integration of the direct instruction learning and practice style teaching model

Direct Instruction (Sudarmanto et al., 2021)	Practice Style (Mosston & Ashworth, 2008; Pebriyandi et al., 2025)	Integration Model
Communicating objectives and student preparation	Presenting movement tasks (demonstration and explanation of tasks)	Communicating objectives, explaining tasks, and preparing students
Demonstrating knowledge or skills	Distributing task sheets	Demonstrating the material and giving out task sheets
Providing guided practice	Practicing tasks independently or individually	Performing guided exercises and practicing tasks independently
Analyzing understanding and providing feedback	Giving feedback to each individual	Providing feedback on understanding analysis
Providing independent exercises	Evaluating learning and follow-up exercises	Evaluating learning and further exercises

This integration results from the combination of the two models, which share several overlapping learning stages. The overlap is illustrated in Figure 1.

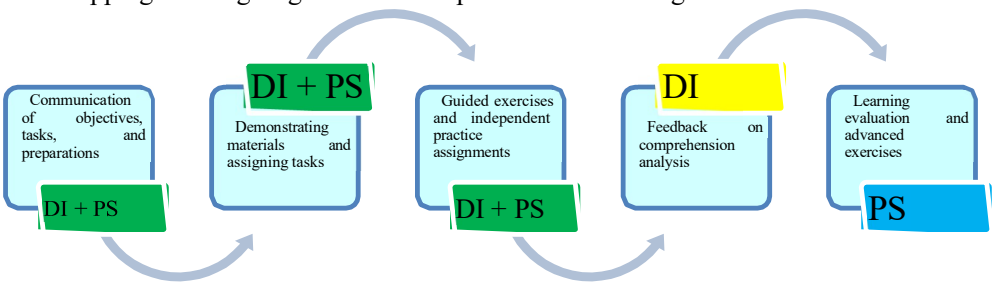


Figure 1. Syntactic Intersection of the Integration Results

METHOD

This study uses a quantitative approach with a quasi-experimental method to evaluate the effect of integrating the Direct Instruction and Practice Style learning models on strengthening WASAKA attitude and increasing students' muscle strength. The research design used is a Pretest-Posttest Control Group Design, which allows researchers to take measurements before and after treatment on two different groups of, namely the experimental group and the control group (Sugiyono, 2022). In this design, the experimental group received treatment in the form of integrated learning, while the control group followed conventional learning without model intervention. The research design can be seen in Table 2.

Table 2. Pretest-post test control group research design

Group	Pretest	Treatment	Posttest
Experimental	O_1	Integration of Direct Instruction and Practice Style (X)	O_2
Control	O_3	Conventional teaching style (–)	O_4

The population in this study consisted of all fifth and sixth grade students in two elementary schools in Banjar Regency, namely Muhammadiyah Martapura Natural Elementary School and Muhammadiyah Pasayangan Elementary School. The sampling technique used a purposive sampling approach, with a total sample size of 80 students. Each school provided two classes that were equivalent in terms of academic and physical characteristics, with 40 students in the experimental group and 40 students in the control group.

Copyright © 2026 JCEN, *Hernita Warusni*

This study employed two types of instruments. First, the instrument used to measure the WASAKA attitude was developed based on character indicators, including responsibility, hard work, and discipline, with reference to the character instrument development guidelines by Rusilowati et al. (2021). This instrument took the form of a questionnaire using a four-point Likert scale, consisting of 30 statements that had undergone validity and reliability testing. Second, to measure students' muscle strength, a set of standardized physical fitness tests was administered, namely push-ups for arm muscle strength, sit-ups for abdominal muscle strength, and vertical jumps for leg muscle strength.

The research procedure began with a preparation stage, which included instrument development, obtaining permission from schools and parents, and training teachers who would implement the learning intervention. Next, a pretest was conducted to measure the students' initial conditions in terms of both their WASAKA attitude and muscle strength. After that, the experimental group received treatment over a six-week period through Physical Education learning that integrated the Direct Instruction and Practice Style models, while the control group participated in learning using a conventional approach. The treatment was carried out consistently according to the schedule and syllabus that had been developed in advance. After the intervention had been completed, all students were given a posttest to evaluate the changes that had occurred. The data obtained from the pretest and posttest were analyzed using IBM SPSS software version 26. Before conducting the main analysis, a normality test (using Kolmogorov–Smirnov) and a homogeneity test (using Levene's Test) were performed to ensure the data met the assumptions of normal and homogeneous distribution. The main analysis was performed using the Paired Sample t-Test and Wilcoxon Signed Rank Test, which were used to examine the difference in scores between the pretest and posttest in each group. Moreover, the Independent Sample t-Test and Man-Whitney U test were also administered to compare the posttest results between the experimental and control groups. In addition, a Simple Linear Regression test was conducted to identify the relationship between WASAKA attitude and the students' muscle strength.

FINDINGS AND DISCUSSION

Findings

This study aims to test the effectiveness of integrating the Direct Teaching and Practice model in fostering students' WASAKA attitudes and increasing muscle strength through physical education. The analysis was conducted using a quantitative approach, involving an experimental group and a control group, with each group consisting of two classes. Data processing included descriptive statistics, prerequisite tests, and inferential tests. The following are the results of descriptive statistics for the WASAKA character and muscle strength of the two research groups, presented in Table 3.

Table 3. Descriptive results of WASAKA character and muscle strength

Results	Group	N	Mean	Std. Deviation	Std. Error	Min	Max
Pretest	WASAKA A1 Attitude Control Group	20	591.000	605.153	135.316	47.0	70.0
	WASAKA B1 Attitude Experiment Group	20	66.90	666.412	149.014	58.0	78.00
	Control Group Muscle Strength A1	20	46.75	1.321.433	295.481	18.00	68.00
	Experimental Group Muscle Strength B1	20	586.500	1.684.379	376.639	15.0	80.00
	Total	80	578.500	1.349.834	150.916	15.00	80.00
Posttest	WASAKA A1 Attitude Control Group	20	59.35	581.536	130.035	47.00	69.00
	WASAKA B1 Attitude Experiment Group	20	75.60	1.084.047	242.400	59.0	99.00
	Control Group Muscle Strength A1	20	466.000	1.138.975	254.682	26.00	68.00
	Experimental Group	20	71.70	1.665.154	372.340	30.0	93.00

Copyright © 2026 JCEN, *Hernita Warusni*

	Muscle Strength B1						
	Total	80	633.125	1.627.889	182.004	26.00	99.00
Pretest	WASAKA A2 Attitude	20	64.00	677.457	15.148	48	76.0
	Control Group						
	WASAKA B2 Attitude	20	741.000	772.487	172.733	63.0	88.0
	Experiment Group						
	Control Group Muscle	20	55.75	13.96	312.197	32.0	85.00
	Strength A2						
	Experimental Group	20	513.000	1.258.278	281.359	20.00	76.0
	Muscle Strength B2						
	Total	80	612.875	1.366.710	152.803	20.00	88.00
Posttest	Control Group	20	65.60	708.148	158.347	54.0	79.00
	WASAKA						
	Attitude A2						
	WASAKA B2 Attitude	20	822.000	775.683	173.448	69.0	96.00
	Experiment Group						
	Control Group Muscle	20	47.55	1.040.989	232.772	30.0	70.00
	Strength A2						
	Experimental Group	20	701.000	1.669.510	373.314	27.0	91.00
	Muscle Strength B2						
	Total	80	663.625	1.662.562	185.880	27.00	96.00

Note: A1: Class A1 Muhammadiyah Martapura Natural Elementary School; A2: Class A2 Muhammadiyah Pasayangan Elementary School; B1: Class B1 Muhammadiyah Martapura Natural Elementary School; B2: Class B2 Muhammadiyah Pasayangan Elementary School

To ensure the feasibility of parametric testing, a normality test was conducted using the Shapiro–Wilk test, while homogeneity was assessed using Levene's Test. The test results showed that all data were normally distributed and exhibited homogeneity. The results of the normality and homogeneity tests are presented in Table 4-6.

Table 4. Results of the normality test for WASAKA attitude

Results	Group	Statistic	df	Sig
Pretest	Control Class	0.941	20	0.254
	Experimental Class	0.914	20	0.077
Posttest	Control Class	0.946	20	0.315
	Experimental Class	0.961	20	0.558
Pretest	Control Class	0.955	20	0.448
	Experimental Class	0.928	20	0.142
Posttest	Control Class	0.971	20	0.768
	Experimental Class	0.973	20	0.816

Table 5. Results of muscle strength normality test

Results	Group	Statistic	df	Sig
Pretest	Control Class	0.970	20	0.759
	Experimental Class	0.911	20	0.066
Posttest	Control Class	0.962	20	0.580
	Experimental Class	0.899	20	0.140
Pretest 1	Control Class	0.974	20	0.833
	Experimental Class	0.948	20	0.344
Posttest1	Control Class	0.920	20	0.098
	Experimental Class	0.915	20	0.079

Table 6. Results of the homogeneity of variances test

Results		Levene Statistic	df1	df2	Sig
WASAKA	Based on Mean	2.787	3	76	0.046
Attitude	Based on Median	2.501	3	76	0.066
	Based on Median and with adjusted df	2.501	3	60.662	0.068
	Based on trimmed mean	2.653	3	76	0.055
Muscle	Based on Mean	1.487	3	76	0.225
Strength	Based on Median	1.289	3	76	0.284

Copyright © 2026 JCEN, *Hernita Warusni*

Based on Median and with adjusted df	1.289	3	64.627	0.286
Based on trimmed mean	1.398	3	76	0.25

Furthermore, the results show that WASAKA attitude has a significance value of $p < 0.05$ (See Table 6), so it can be concluded that the data is not homogeneous. Furthermore, the muscle strength results show a significance value of $p>0.05$, thus it can be concluded that the data is homogeneous (See Table 6).

Based on the results of the normality test for all experimental and control classes from both schools, all significance values (Sig.) were found to be > 0.05, indicating that the data were normally distributed across all groups. This finding strengthens the basis for conducting further parametric paired sample t-test analyses for the WASAKA attitude variables (See Table 7) and muscle strength (See Table 8).

Table 7. Results of the paired sample t-test for WASAKA attitude

No	Results	Group	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (two-tailed)
Pair A1	Pretest - Posttest	Control	-0.25000	0.71635	0.16018	-1.561	19	0.135
Pair A2	Pretest - Posttest	Control	-160.000	554.788	124.054	-1.290	19	0.213
Pair B1	Pretest - Posttest	Experiment	-870.000	968.504	216.564	-4.017	19	0.001
Pair B2	Pretest - Posttest	Experiment	-810.000	521.031	116.506	-6.952	19	0.000

Table 8. Results of paired sample t-test for muscle strength

No	Results	Group	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (two-tailed)
Pair A1	Pretest - Posttest	0.1500	581.536	130.035	0.115	19	).909	0.135
Pair A2	Pretest - Posttest	82.000	869.119	194.341	4.219	19	).000	0.213
Pair B1	Pretest - Posttest	-1.305.000	437.066	0.97731	-13.353	19	0.00	0.001
Pair B2	Pretest - Posttest	-1.880.000	934.486	208.957	-8.997	19	0	0.000

The results showed clear differences between the control and experimental groups in terms of WASAKA attitudes and muscle strength. For WASAKA attitudes (see Table 7), a paired-sample t-test in the control group showed no significant difference in either Pair A1 ($p = 0.135$) or Pair A2 ($p = 0.213$), thus concluding that there was no significant improvement in these groups. Conversely, in the experimental group, there was a significant difference between the pretest and posttest results for both Pair B1 ($p = 0.001$) and Pair B2 ($p = 0.000$). This confirms that the integration of the Direct Instruction Model and the Hands-On Style significantly improved students' WASAKA attitudes.

In terms of muscle strength (see Table 8), the test results in the control group showed no significant difference in Pair A1 ($p = 0.909$), while Pair A2 showed a significant difference ($p = 0.000$). This indicates an increase in muscle strength in some indicators, although not consistently across all aspects. Meanwhile, in the experimental group, both Pair B1 and Pair B2 showed significant results with a p-value of 0.000, indicating a more consistent and comprehensive increase in muscle strength. Overall, the results of this study prove that innovation in physical education through the integration of the Direct Instruction Model and Practice Style is effective in building students' WASAKA character and increasing their muscle strength compared to conventional learning.

The next analysis aims to compare the posttest results between the experimental group and the control group as a whole. The results of the independent sample t-test are presented in Table 9.

Table 9. Results of the independent samples t-test

Results	Variance	F	Sig	t	df	Sig. (2-tailed)
WASAKA attitude	Equal variances assumed	6.392	0.016	-5.907	38	0.000
	Equal variances not assumed			-5.907	29.099	0.000
Muscle Strength	Equal variances assumed	2.597	0.115	-5.126	38	0.000
	Equal variances not assumed			-5.126	31.834	0

The results show that WASAKA attitude and muscle strength have a significance value

Copyright © 2026 JCEN, *Hernita Warusni*

(Sig. 2-tailed) of 0.000 < 0.05 (See Table 9), indicating that there is a significant difference between the control and experimental classes. In other words, the treatment given to the experimental classes had a real effect on increasing the students' muscle strength compared to the control classes. These findings confirm that the treatment or learning intervention implemented was effective within this context of this school.

The next analysis was carried out using the ANOVA test, which aims to determine whether there are significant differences between the averages of several different sample groups.

Table 10. ANOVA test results

Results	Group	Sum of Squares	df	Mean Square	F	Sig.
WASAKA Attitude	Between Groups	6.221.838	3	2.073.946	31.706	0.000
	Within Groups	4.971.350	76	65.413		
	Total	11.193.188	79			
Muscle Strength	Between Groups	11.387.238	3	3.795.746	19.12	0.000
	Within Groups	15.087.750	76	198.523		
	Total	26.474.988	79			

The ANOVA test results show that there are significant differences between groups on both research variables (See Table 10). In terms of WASAKA attitude, the F value is 31.706 with p = 0.000 < 0.05, which means that there are significant differences between groups A1, A2, B1, and B2. Similarly, in terms of muscle strength, the F value was 19.120 with p = 0.000 < 0.05, so it can be concluded that there were significant differences between groups. This shows that different learning treatments had a real effect on the formation of WASAKA attitude and the increase in students' muscle strength.

Next, a Post Hoc test was conducted with the results showing detailed differences between groups (See Table 11). In terms of WASAKA attitude, almost all comparisons between groups showed significant differences, except between class B1 and B2 (p = 0.140), which did not differ significantly. This indicates that the integration of the Direct Instruction Model and Practice Style in the experimental classes (B1 and B2) resulted in a much higher increase in WASAKA attitude compared to the control groups (A1 and A2), even though the differences between the experimental classes were not very significant.

Table 11. Post hoc test results

WASAKA Attitude	Games-Howell	Class A1	Class A2	-6.25000*	204.897	0.021
			Class B1	-16.25000*	275.077	0.000
			Class B2	-22.85000*	216.780	0.000
		Class A2	Class A1	6.25000*	204.897	0.021
			Class B1	-10.00000*	289.537	0.008
			Class B2	-16.60000*	234.857	0.000
		Class B1	Class A1	16.25000*	275.077	0.000
			Class A2	10.00000*	289.537	0.008
			Class B2	-660.000	298.064	0.140
		Class B2	Class A1	22.85000*	216.780	0.000
			Class A2	16.60000*	234.857	0.000
			Class B1	660.000	298.064	0.140
Muscle Strength	Bonferroni	Class A1	Class A2	-0.95000	445.559	1.000
			Class B1	-25.10000*	445.559	0.000
			Class B2	-23.50000*	445.559	0.000
		Class A2	Class A1	0.95000	445.559	1.000
			Class B1	-24.15000*	445.559	0.000
			Class B2	-22.55000*	445.559	0.000
		Class B1	Class A1	25.10000*	445.559	0.000
			Class A2	24.15000*	445.559	0.000
			Class B2	160.000	445.559	1.000
		Class B2	Class A1	23.50000*	445.559	0.000
			Class A2	22.55000*	445.559	0.000
			Class B1	-160.000	445.559	1.000

Copyright © 2026 JCEN, *Hernita Warusni*

Meanwhile, in terms of muscle strength, the Bonferroni post hoc test showed that the experimental groups (B1 and B2) demonstrated significant differences compared to the control groups (A1 and A2), with a p-value of 0.000 in most comparisons. However, there were no significant differences between B1 and B2 (p = 1.000) or between A1 and A2 (p = 1.000) (See Table 11).

Thus, the application of the innovative learning model was proven to significantly improve students' muscle strength compared to conventional learning, although the increase was relatively similar between the experimental classes. Overall, the results of the ANOVA and post hoc tests confirm that learning innovation through the integration of the Direct Instruction Model and Practice Style is more effective than conventional learning in both fostering WASAKA attitude and improving students' muscle strength.

Table 12. Simple linear regression results between WASAKA attitude and muscle strength

Variable WASAKA - Muscle strength			Sum of Squares	df	Mean Square	F	Sig.
School a	control class	Regression	21.425	1	21.425	0.621	0.441[b]
		Residual	621.125	18	34.507		
	experiment class	Regression	114.127	1	114.127	0.970	0.338[b]
		Residual	2.118.673	18	117.704		
School b	control class	Regression	23.593	1	23.593	0.457	0.508[b]
		Residual	929.207	18	51.623		
	experiment class	Regression	85.882	1	85.882	1.462	0.242[b]
		Residual	1.057.318	18	58.74		

Note: a. Muhammadiyah Martapura Natural Elementary School; b. Muhammadiyah Martapura Pasayangan Elementary School

To determine the extent of the relationship between WASAKA attitude and muscle strength across class categories (control and experimental) in each school, a simple linear regression analysis was performed. This test aimed to determine whether the independent variable (treatment/learning intervention) had a significant effect on the dependent variables (WASAKA attitude and muscle strength). The analysis was conducted separately for each group in two schools, namely Muhammadiyah Martapura Natural Elementary School and Muhammadiyah Pasayangan Elementary School. The complete test results are presented in Table 12.

Based on the results of the simple linear regression analysis between WASAKA attitude and students' muscle strength in the two schools (See Table 12), no statistically significant relationship was found between these variables across all groups. At Muhammadiyah Martapura Natural Elementary School, both the control class and the experimental class showed significance values of 0.441 (F = 0.621) and 0.338 (F = 0.970), respectively, indicating that WASAKA attitude had no significant effect on students' muscle strength. A similar pattern was observed at Muhammadiyah Pasayangan Elementary School, where the control class showed a significance value of 0.508 (F = 0.457), while the experimental class obtained a significance value of 0.242 (F = 1.462). All of these significance values were above the threshold of 0.05. Therefore, it can be concluded that, overall, there was no significant relationship between WASAKA attitude and students' muscle strength in either the experimental or control groups across the two schools studied.

In other words, although there were differences in outcomes between the control and experimental groups, the relationship was not statistically strong enough to support the conclusion of a direct effect based on the simple linear regression analysis. These findings indicate that there may be other factors influencing muscle strength outcomes beyond the treatment variables implemented in this study.

Discussion

The author should discuss the results and how they can be interpreted from the perspective of previous studies and the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

Based on the research results, it was found that the integration of the Direct Instruction and Practice Style models proved to be effective in shaping WASAKA attitude and significantly increasing students' muscle strength in the experimental class compared to the control class. In terms of WASAKA attitude, the paired sample t-test results showed a significant increase in the

Copyright © 2026 JCEN, *Hernita Warusni*

experimental class at Muhammadiyah Martapura Nature School (t = -4.017; p = 0.001) and at Muhammadiyah Martapura Pasayangan Elementary School (t = -6.952; p = 0.000), with the control class did not show a significant difference (p>0.05). Similarly, in terms of muscle strength, the Wilcoxon Signed Rank Test showed a significant increase in all aspects (arms, abdomen, and legs) in the experimental class with a significance value of 0.000, while most aspects in the control class did not experience significant changes (p>0.05). The Independent Sample t-Test for WASAKA attitude showed a significant difference between the experimental and control classes in both schools, with values of p = 0.004 and p = 0.000. The Mann–Whitney U test also supported these findings, particularly at Muhammadiyah Martapura Natural Elementary School, which showed a significance value of 0.000 for all aspects of muscle strength. Meanwhile, at Muhammadiyah Pasayangan Elementary School, only arm muscle strength showed significant results (p = 0.000). However, simple linear regression analysis showed that there was no significant relationship between WASAKA attitude and muscle strength (p>0.05) in all groups), indicating that both increased independently and did not directly influence each other. These findings show that the learning intervention implemented had a positive impact on the development of students' character and physical attitudes, even though there was no direct statistical correlation between the two.

The interpretation of these findings is consistent with previous literature on the important role of physical education in character development. Muhasibi et al. (2024) found that physical education and sports have a significant positive influence on the students' character formation. Similar findings were reported in this study, which showed that students who are active in physical education tend to demonstrate more positive character traits, including sportsmanship, cooperation, and discipline. The results of this study confirm that the integrative DI–Practice Style learning model is highly effective in instilling these values. The structured syntax of Direct Instruction is believed to foster a disciplined attitude among students (Arifin, 2023), as teachers provide clear and systematic learning procedures. Meanwhile, the Practice Style component places students in direct practice with a degree of independence, enabling them to make their own decisions and take responsibility for their training process (Proios, 2019). These principles are highly relevant to the components of WASAKA. For example, students who are encouraged to engage actively in practice learn not to give up easily when facing difficulties and improve their discipline through repeated practice. Therefore, a significant increase was observed in the aspects of perseverance, discipline, and responsibility among students in the experimental group. This argument is supported by Nurhasanah et al. (2024), who reported that the application of Practice Style increases students' motivation, participation, and sense of responsibility in floor exercise learning. In other words, students become more independent and responsible for their learning process, which aligns with our findings regarding the increase in responsibility scores as part of the WASAKA attitude.

From a physical perspective, statistical test results also showed a significant increase in the strength of the arms, abdomen, and legs of students in the experimental group. The average post-training test scores were higher than the pre-training scores; for example, push-ups for the arms, sit-ups for the abdomen, and squats for the legs increased significantly. The paired samples t-test for each muscle strength indicator produced a p-value <0.05, indicating the success of the training program in increasing muscle strength. This difference was even more apparent when tested between groups; the posttest scores of the experimental group were consistently higher than those of the control group (Independent t or Mann-Whitney test, p<0.05). Thus, a specifically planned learning intervention containing physical strength training effectively improved the students' physical capacity.

These findings regarding increased muscle strength are consistent with previous studies on specific physical exercises. For example, a study conducted by Bete (2020) showed that a push-up training program can increase students' arm muscle strength by up to 29%. Similarly, Meiriawati (2013) reported that variations in sit-up angles (40°, 90°, and 120°) significantly increased students' abdominal muscle strength, with the 120° angle producing the greatest improvement. Similarly, research on squat variations in futsal athletes found that squat training for 18 sessions (3 times a week) significantly increased leg muscle power (Saudini & Sulistyorini, 2021). The results of this study are consistent with these findings; students involved in repetitive

Copyright © 2026 JCEN, *Hernita Warusni*

training in the experimental group showed significant progress in push-up, sit-up, and squat test results used to measure muscle strength. All of these findings consistently demonstrate that systematic body strength training contributes to increased muscle strength, in accordance with sports physiology theory, which suggests that repeated strength training enhances muscle fiber hypertrophy and contraction (Bernárdez-Vázquez et al., 2022). The significant improvement observed in these three aspects of muscle strength also supports the findings of Nurhasanah et al. (2024), who reported that Practice Style can enhance students' muscle strength through active involvement in training programs.

The use of various statistical tests in this study ensures the robustness of the findings. Before testing the hypotheses, the data were subjected to normality testing. Variables that met the assumption of normality were analyzed using parametric tests (t-tests), whereas variables that did not meet this assumption were analyzed using non-parametric tests (the Wilcoxon test for paired analysis and the Mann–Whitney U test for between-group comparisons). The results of the normality test generally met the required assumptions; therefore, most of the analyses employed t-tests. However, repeated analyses using the Wilcoxon and Mann–Whitney tests produced similar conclusions. This consistency indicates that the increases in WASAKA scores and muscle strength were not due to chance and were statistically significant. Subsequent linear regression analysis showed that the integrative learning model variable had a significant positive coefficient in predicting changes in WASAKA scores, indicating that this model had a predictive effect on students' attitudes. Thus, the rigorous statistical methodology supports the argument that the observed effects genuinely resulted from the learning treatment rather than from other variables. Overall, the results of this study confirm that learning innovations that integrate Direct Instruction and Practice Style are effective in improving students' character and physical fitness. The improvement in perseverance, discipline, and responsibility is in line with the active learning concept recommended in the Merdeka Curriculum and character education (Muhasibi et al., 2024). Meanwhile, the success in increasing arm, abdominal, and leg muscle strength through structured exercises reinforces the role of physical education as a vehicle for planned physical training. A comparison with previous studies shows consistent findings, as both the direct instruction model and practice style have been proven to improve students' motor learning outcomes, and combining the two provides synergistic results. Thus, a learning strategy that combines clear teacher guidance (Direct Instruction) with independent student practice (Practice Style) not only fosters greater discipline and responsibility among students but also significantly improves their muscle strength. These findings have important implications for physical educators in applying similar approaches to maximize students' character development and physical fitness.

CONCLUSION

Based on the comprehensive research findings, it can be concluded that the integration of the Direct Instruction and Practice Style learning models has proven effective in addressing the three main research questions. First, this model can foster and strengthen the WASAKA attitude among students, namely perseverance, discipline, and responsibility, as reflected in the significant improvement in attitude indicators after participation in integration-based learning. The structured and focused learning process through Direct Instruction, combined with the independent practice opportunities provided by Practice Style, successfully created a learning environment that fostered meaningful character values. Second, this model was also able to significantly improve students' muscle strength. A series of systematic and repetitive physical activities in the learning process were able to stimulate optimal improvement in the strength of students' arms, abdominal muscles, and legs. Third, although both WASAKA attitude and muscle strength variables increased, the results of the study showed that the two were not directly related; that is, an increase in one aspect did not necessarily affect an increase in the other. This indicates that character building and physical fitness improvement can run in parallel through the right learning approach, but do not always have a causal relationship with each other. Furthermore, these findings confirm that the integration of the Direct Instruction and Practice Style models is an effective and relevant pedagogical innovation to be applied in physical education to support the achievement of holistic educational goals, both in terms of students' character and physical fitness.

Copyright © 2026 JCEN, *Hernita Warusni*

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the Rector and the Head of the Institute for Research and Community Service of Universitas Lambung Mangkurat for their support and funding through the competitive internal research grant program. The authors also extend their appreciation to the Principal of Muhammadiyah Martapura Natural Elementary School and Muhammadiyah Pasayangan Elementary School for granting permission and providing valuable support throughout the data collection process.

REFERENCES

Arifin, A. (2023). Implementasi model pembelajaran pengajaran langsung untuk meningkatkan hasil belajar siswa pada pembelajaran PJOK materi gerak spesifik permainan bola basket di kelas VII-G semester 1 SMPN 1 Bolo tahun pelajaran 2022/2023. *Jurnal Pendidikan dan Pembelajaran Indonesia (JPPI), 3*(1), 69–82. DOI: https://doi.org/10.53299/jppi.v3i1.311

Bernárdez-Vázquez, R., Raya-González, J., Castillo, D., & Beato, M. (2022). Resistance training variables for optimization of muscle hypertrophy: An umbrella review. *Frontiers in Sports and Active Living, 4*(July), 1–12. DOI: https://doi.org/10.3389/fspor.2022.949021

Bete, D. E. M. T. (2020). Pengaruh latihan push-up terhadap peningkatan kekuatan otot lengan pada siswa ekstrakurikuler bola voli di SMPK Nurobo. *Jurnal Penelitian dan Pengembangan Pendidikan, 3*(2), 93–101.

Bronikowska, M., Mouratidou, K., Ludwiczak, M., Karamavrou, S., Mckeel, C., & Bronikowski, M. (2024). Systematic review on social/moral competence interventions in Physical Education. *Biomedical Human Kinetics, 16*(1), 55–77. DOI: https://doi.org/10.2478/bhk-2024-0007

Douckworth, A. (2016). *Grit: The power of passion and perseverance*. Scribner.

Fadillah, M., Warni, H., & Arifin, S. (2025). Filosofi karakter waja sampai kaputing atlet sepak bola Kalimantan Selatan PON XXI. *Jendela Olahraga, 10*(02), 21–29. DOI: https://doi.org/http://dx.doi.org/10.26877/jo.v10i2.21714

Fajri, A., Yulisatria, G., Malasari, C. A., Dongoran, M. F., & Siregar, F. S. (2025). Strategi pembelajaran efektif dalam pendidikan jasmni di Sekolah Dasar: Sebuah tinjauan literatur. *Jurnal Ilmiah STOK Bina Guna Medan (JISBG), 13*(1), 97–111. DOI: https://doi.org/https://doi.org/10.55081/jsbg.v13i1.3731

Ihwanto, N., Warni, H., & Mashud, M. (2022). Efforts to improve collaboration skills and student learning outcomes using the teams' games tournament model. *Jurnal Maenpo: Jurnal Pendidikan Jasmani Kesehatan Dan Rekreasi*. DOI: https://doi.org/10.35194/jm.v12i2.2768

Khairuddin, Alnedral, Komaini, A., Syharastani, & Masrun. (2022). Effect of learning approach and motor skills on physical fitness. *Journal of Physical Education and Sport, 22*(9), 2273–2280, 289. DOI: https://doi.org/10.7752/jpes.2022.09289

Meiriawati, M. (2013). Pengaruh pelatihan sit-up besar sudut 45', 90' dan 120' terhadap kekuatan otot perut. *Jurnal Ilmu Keolahragaan Undiksha, 1*(1). DOI: https://doi.org/https://doi.org/10.23887/jiku.v1i1.1590

Mosston, M., & Ashworth, S. (2008). Teaching physical education: First on-line edition. *In Copyright 2012 Spectrum of Teaching Styles*.

Muhasibi, A. Al, Nasrullah, M. H., Chaniago, F. M., & Hambali, B. (2024). Pengaruh pendidikan jasmani dan olahraga terhadap karakter siswa. *Integrated Sport Journal (ISJ), 2*(2), 65–70. DOI: https://doi.org/https://doi.org/10.58707/isj.v2i2.780

Mustapha, B., Houcine, B., Touati, A. B., & Djamel, M. (2019). Effectiveness of plyometric exercises to improve muscular strength and digital achievement for students in shot put. *International Journal of Physical Education, Fitness and Sports, 8*(2), 36–41. DOI: https://doi.org/https://doi.org/10.26524/ijpefs1925

Mutia, M., Warni, H., & Sarmidi, S. (2019). Peran guru pendidikan jasmani dalam menanamkan karakter keapada peserta didik di SD Negeri Atu-Atu Kecamatan Pelaihari Kabupaten Tanah Laut. *Multilateral Jurnal Pendidikan Jasmani dan Olahraga, 18*(2), 120–125. DOI:

Copyright © 2026 JCEN, *Hernita Warusni*

https://doi.org/10.20527/multilateral.v18i2.7623

Naro, W., & Gani, S. M. (2023). How aspects of characteristic-based learner development: Cognitive, affective, and psychomotor aspects. *Didaktika: Jurnal Kependidikan, 12*(1), 1–14. DOI: https://doi.org/https://doi.org/10.58230/27454312.171

Nuraini, A. S., Annisa, H., Rahmayanti, I., Ayuni, L. Q., Makiyyah, N. Z. N., Aprilianti, S. N., & Mulyana, A. (2024). Integrasi nilai-nilai karakter dalam pembelajaran pendidikan jasmani, olahraga, dan kesehatan (PJOK) di jenjang Sekolah Dasar. *Mutiara: Jurnal Penelitian dan Karya Ilmiah, 2*(3), 80–94. DOI: https://doi.org/https://doi.org/10.59059/mutiara.v2i3.1329

Nurhasanah, S. H., Basuki, S., & Warni, H. (2024). Gaya mengajar practice style terhadap hasil belajar senam lantai. *Special Issue National Conference: Mengembalikan Marwah PJOK dan Penerapan Teknologi dalam Pembelajaran PJOK Nasional, 23*(4), 118–126. DOI: https://doi.org/http://dx.doi.org/10.20527/multilateral.v23i4.20890

Pebriyandi, Mashud, & Warni, H. (2025). The fostering student learning independence in physical education learning based on gender: Integrating teaching styles. *IJPESS: Indonesian Journal of Physical Education and Sport Science, 5*(1), 1–14. DOI: https://doi.org/https://doi.org/10.52188/ijpess.v5i1.917

Proios, M. (2019). Effects of practice style on a complex gymnastics skill performance of high-, medium-, and low-skilled learners. *Science of Gymnastics Journal, 11*(1), 77–90. DOI: https://doi.org/10.52165/sgj.11.1.77-90

Ridha, S., & Warni, H. (2024). The role of physical education in shaping champion athletes' character at PON: A literature study. *Jurnal Patriot, 6*(4), 148–155. DOI: https://doi.org/https://doi.org/10.24036/patriot.v%vi%i.1121

Robinson, K., Riley, N., Owen, K., Drew, R., Mavilidi, M. F., Hillman, C. H., Faigenbaum, A. D., Garcia, A., David, H., & Lubans, R. (2023). Effects of resistance training on academic outcomes in school - aged youth: A systematic review and meta - analysis. *Sports Medicine, 53*(11), 2095–2109. DOI: https://doi.org/10.1007/s40279-023-01881-6

Rohmansyah, N. A., Mawarti, S., & Hiruntrakul, A. (2022). The effect of teaching style on affective and cognitive motivation in physical education. *Jurnal Keolahragaan, 10*(2), 147–156.

Ross, D. M., & Pascale, A. M. (2020). An exploration of mosston's spectrum of teaching styles in athletic training education. journal of sports medicine and allied health sciences. *Official Journal of the Ohio Athletic Trainers Association, 6*(2), 5. DOI: https://doi.org/https://doi.org/10.25035/jsmahs.06.02.05

Rusilowati, A., Supardi, K. I., Fathonah, S., Juliyanto, Ek., Firdaus, Annur, S., Harjito, Dewi, N. R., Jumini, S., Falah, M., Desy, R., Dahnuss, D., Hasbi, I., & Siswanto. (2021). *Pengembangan instrumen karakter dalam pembelajaran IPA*.

Sarbaini, Nuryadin, Asnawi, A., Fatimah, Mukhyar, & Hanafi, U. (2012). *Pedoman pendidikan karakter WASAKA (Waja sampai Kaputing) Universitas Lambung Mangkurat*. ASWAJA PRESSINDO YOGJAKARTA.

Sari, W. A., Warni, H., & Arifin, S. (2024). The role of physical education sports and health in building character. *Indonesian Journal of Physical Education and Sport Science, 4*(2), 204–211. DOI: https://doi.org/https://doi.org/10.52188/ijpess.v4i2.731

Saudini, D., & Sulistyorini, H. (2021). Pengaruh latihan squat terhadap peningkatan power tungkai atlet futsal. *Jurnal Keolahragaan, 10*(2), 55–63. DOI: https://doi.org/http://dx.doi.org/10.17977/um077v5i22021p60-65

Shukla, S. (2017). Grit: The power of passion and perseverance. *Harvard Educational Review, 87*(4), 588–592. DOI: https://doi.org/https://doi.org/10.17763/1943-5045-87.4.588

Sierra-Ríos, J. V., Clemente, F. M., Rey, E., & González-Víllora, S. (2020). Effects of 6 weeks direct instruction and teaching games for understanding programs on physical activity and tactical behaviour in U-12 soccer players. *International Journal of Environmental Research and Public Health, 17*(14). DOI: https://doi.org/10.3390/ijerph17145008

Sudarmanto, E., Mayratih, S., Kurniawan, A., Abdillah, L. A., Martriwati, Siregar, T., Noer, R. M., Sholihah, M., Rusli, M., Yudaningsih, N., & Firmansyah, H. (2021). *Model pembelajaran era society 5.0*.

Copyright © 2026 JCEN, *Hernita Warusni*

Sugiyono, S. (2022). *Metode penelitian kuantitatif kualitatif dan R&D*. ALFABETA.

UURI. (2003). *Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional*.

Warni, H., & Rubianti, A. (2018). The implementation of character education in physical education and health subject at state junior high school in Banjarbaru. *First Indonesian Communication Forum of Teacher Training and Education Faculty Leaders International Conference on Education 2017, 174*, 320–324. DOI: https://doi.org/10.2991/ice-17.2018.69

Copyright © 2026 JCEN, *Hernita Warusni*