

**Implementation of Physical Test Results Measurement Using a Pencak Silat Sports Web Application**Faradillah Dwi Afriyanti<sup>1</sup>, Hartati<sup>2✉</sup>, Destriana<sup>3</sup>Program Study of Physical Education and Health Sciences, Faculty of Teacher Training and Education, Sriwijaya University, Palembang, Indonesia<sup>123</sup>**Article History**Received Desember 2023  
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**Abstract**

This research constitutes a quantitative descriptive study employing a survey method, specifically a fitness test administered to sixth-grade students at State Elementary School 112 Palembang. The primary objective of this study is to establish normative categories for assessing the physical fitness of students in the sport of pencak silat using a dedicated application. The key components evaluated in the context of pencak silat are strength, speed, agility, flexibility, and endurance. The study involved 30 participants, comprising 11 male students and 19 female students. Test instruments for data collection included the sit-up test for assessing strength, the 30-meter running test for speed, the agility t-test for agility, the sit and reach test for flexibility, and the bleep test for endurance. The collected data underwent analysis using quantitative descriptive techniques. The research findings revealed that the strength test results fell into the poor category, speed into the very poor category, agility into the sufficient category, flexibility into the very poor category, and endurance into the very poor category. Consequently, the overall assessment of the physical condition of sixth-grade students at State Elementary School 112 Palembang indicates a very poor category. In summary, the study concludes that the average physical fitness of class VI students at State Elementary School 112 Palembang is deemed very poor. It is recommended that appropriate exercises be implemented to enhance the physical fitness of the students.

**How to Cite**

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## INTRODUCTION

Sports are an inseparable part of human life, playing a crucial role in maintaining physical health. Additionally, sports are anticipated to serve as a platform for enhancing achievements, character, and positive personality traits, contributing to the creation of a fully qualified human resource for national development. This is articulated in the Republic of Indonesia Law No. III of 2005 concerning the National Sports System, Article 1, paragraph 13, which defines "performance sports" as systematically and progressively cultivating sports knowledge to achieve excellence.

With proper athlete development and supported by effective technology, attaining maximum performance becomes more feasible. Science and technology are essential across all sports disciplines, including Pencak Silat. Students can be considered agile if they can swiftly and accurately change direction and body position while moving, maintaining balance and awareness of their body position. Agility training involves rapid and precise movements in all directions without losing balance, tailored to the specific needs of each sports discipline (Octavia & Mardela, 2019). According to Hartati (2019), technological advancements in sports have progressed, both in coaching sciences and physical testing and measurements.

One of the sports receiving structured development is Pencak Silat, which has showcased commendable achievements at regional, national, and even international levels. According to Kriswanto (2015:13), Pencak Silat is a martial art system passed down by ancestors as a cultural heritage of the Indonesian nation, necessitating preservation, cultivation, and development. It encompasses four aspects: mental-spiritual, artistic-cultural, self-defense, and sports, forming a cohesive unity. Pencak Silat demands good physical condition, serving as a primary foundation for individuals' overall physical fitness and for students or athletes to achieve optimal performance. In the current context, professionalism and success in sports, especially in Pencak Silat, require prime physical condition as the initial benchmark to support training techniques, tactics, and strategies.

To achieve optimal performance in Pencak Silat sports, specific coaching and special attention are essential. Pencak Silat itself must be supported by performance components, as stated by Effendy & Effendi, (2019), that "A student or athlete's ability in a competition is fundamentally determined by five factors: (1) physical condi-

on, (2) technique, (3) tactics, (4) mental (psychological) factors, and (5) nutritional factors. An athlete's performance is not solely determined by technical mastery but also by comprehensive readiness and other supporting factors. The relationship between these factors is inseparable, mutually influencing each other. Coaching that focuses on one factor or gives specific attention to certain factors will not yield optimal performance.

Physical condition is a cohesive unit of interconnected components. This implies that in efforts to enhance physical condition, all these components must be developed. In Pencak Silat, several dominant components of physical condition include strength, agility, speed, flexibility, and endurance (Samsudin, 2023).

To assess a student's physical condition, physical fitness tests are necessary. Physical fitness testing involves collecting data through measurement processes, and the use of measurement tools is crucial. Testing is a form of instrument used to conduct measurements (Saputro et al., 2018). Currently, teachers or coaches still manually conduct tests to obtain physical condition data, making it challenging to calculate and analyze students' physical condition. Hence, a specialized testing tool for the Pencak Silat sports category using an application is needed to assist teachers or coaches in measuring and evaluating students' physical conditions.

In the current era of globalization, media development is rapidly advancing. Technology has become an integral part of human life, directly or indirectly, including in the field of sports, where technology plays a crucial role in every sports activity, one of which is the application-based analysis of the martial art, Pencak Silat. Based on a needs analysis, it has been identified that Pencak Silat coaches or teachers require an application for analyzing students' physical fitness, as there is a lack of knowledge among teachers regarding the developments in science and technology in sports measurement tests.

Upon field observations, it was noted that teachers still rely on manual calculations to assess students' physical test results, leading to time-consuming processes. Data collection for tests has not yet been done using software-based applications due to the unavailability of such applications. According to Gumantan Aditya et al. (2020), this research concludes that the Android-based physical fitness application is a new product in sports measurement tests, making it easier for individuals engaged in sports to classify their physical fitness levels. Irwanto and Romas (2019) state that the Pencak Silat sports application

(AORA) as an android-based application for processing the results of physical tests for adolescent Pencak Silat competitors is effective for coaches or Pencak Silat practitioners. Processing physical test results using the application is considered more efficient compared to manual processing.

The study by Putra & Imam Solikin (2020) emphasizes the importance of an application for measuring the physical condition of soccer players to assess their abilities and biomotor skills. This web-based mobile application facilitates coaches in monitoring the historical physical condition of soccer players, allowing for quick assessments of improvement or decline. Irfan and Komaini (2019) conducted research on the development of a fitness test application based on Android, which was considered suitable for determining physical fitness levels in Indonesia. The results from expert assessments, media experts, and respondents categorized the product as suitable.

Based on field observations and previous research, it is evident that there is a commonality in the use of applications, making it easier for individuals engaged in sports to classify their physical fitness levels. The effective and efficient use of applications for processing Pencak Silat physical test results compared to manual calculations has been established. These applications also assist coaches or teachers in monitoring students' conditions, assessing improvements or declines, and expediting the process of physical condition monitoring. Given these issues, this research is titled "Implementation of Physical Test Measurement Using an Application in the Pencak Silat Sports Branch for Students at State Elementary School 112 Palembang."

**METHODS**

This research employs a quantitative descriptive method using a survey approach through a fitness test administered to sixth-grade students at State Elementary School 112 Palembang. According to (Sugiyono, 2017) quantitative descriptive research aims to describe a phenomenon, event, or occurrence factually, systematically, and accurately. The phenomenon can take the form of shapes, activities, relationships, characteristics, as well as similarities or differences between phenomena. Sampling is a part of the total population and its characteristics (Sugiyono, 2019:127). The sampling technique employed in this research is purposive sampling, a method of selecting samples based on specific considerations. The reason

for using purposive sampling is its suitability for quantitative research or studies that do not generalize, as stated by (Kuantitatif, 2016). The primary goal of using purposive sampling is to find samples that meet specific criteria determined by the researcher, in this case, students from class VI at State Elementary School 112 Palembang who have an interest in Pencak Silat as the sports branch. In this study, a sample of 30 students was selected, consisting of 11 male students and 19 female students, all aged 12 years old.

The standardization of the assessment for the Pencak Silat sports branch physical fitness test serves as the data collection technique. The specific test mentioned is as follows.

**Sit-Up Test**

Participants perform sit-up movements, and the number of perfectly executed sit-ups is counted as the test result within a 60-second period. The assessment norm for the strength test is as follows **Table 1**.

**Table 1.** Sit Up Test Norms assessment for ages 10-12 years

Man	Category	Woman
>30	Excellent	>25
26-30	Good	21-25
20-25	Fair	15-20
17-19	Inadequate	9-14
<17	Very Poor	<9

Source: (Pasaribu, 2020)

**Agility T-Test**

Participants in the test perform the agility T-test by moving their bodies in a multidirectional manner (forward, sideways, and backward). The assessment norm for the agility test is as follows **Table 2**.

**Table 2.** Agility Test Norms for ages 10-12 years

Man (Second)	Category	Woman (Second)
<9.4	Excellent	<10.1
9.5-10.5	Good	10.2-10.10
10.6-11.5	Fair	10.11-11.12
11.6-12.5	Inadequate	12.8-13.10
>12.6	Very Poor	>13.11

Source: (Putra, A.P., & Badri, H, 2021)

**30-meter sprint test**

Participants in the test have one opportunity to complete a sprint, and the fastest time achieved is recorded. The assessment norm for the speed test is as follows **Table 2**.

**Table 3.** Norms for 30-meter sprint test assessment for ages 10-12 years

Man (Second)	Category	Woman (Second)
>6.3	Excellent	>6.7
6.4 – 6.9	Good	6.8 – 7.5
7.0 – 7.7	Fair	7.6 – 8.3
7.8 – 8.8	Inadequate	7.8 – 8.8
<8.9	Very Poor	<8.9

Source: (Pasaribu, 2020)

**Sit and Reach Test**

Participants in the test perform the sit and reach movement, and the results are recorded as the furthest reach from 3 attempts. The assessment norm for evaluating flexibility in this test is as follows **Table 4.**

**Table 4.** Sit and Reach Test Norms assessment for ages 10-12 years

Man	Category	Woman
>14	Excellent	>15
11 – 14	Good	12 – 15
7 – 10	Fair	7 – 11
4 – 6	Inadequate	4 – 6
<4	Very Poor	<4

Source: (Pasaribu, 2020)

**Bleep Test**

Participants in the test perform the bleep test, and the results are recorded when the participant fails or is late twice. The assessment norm for the endurance test is as follows **Table 5.**

**Table 5.** Bleep Test Norms for ages 10-12 years

Man	Category	Woman
>51	Excellent	>37
45-50	Good	31-35
40-44	Fair	26-30
35-39	Inadequate	21-25
<34	Very Poor	<20

Source: (Putra, A.P., & Badri, H, 2021)

Data analysis technique refers to a method used to manage data in order to draw accurate conclusions. In this research, the chosen technique is quantitative descriptive data analysis. The data obtained from each measurement represents raw data from the results obtained by students.

The normality test is conducted using computer software such as SPSS, and the percentage is calculated using the formula:

$$P = N / F \times 100\%$$

Source: ( Rizaldi Setiawan (2017)

Information:

P: persentase

F: frequency

N: number of cases

The normality test aims to demonstrate that the sample data originates from a normally distributed population. In this study, the Shapiro-Wilk test is employed for normality testing, with the following criteria:

Significance level ( $\alpha$ ): 0.05

If the p-value >  $\alpha$ , then the sample is derived from a normally distributed population.

If the p-value <  $\alpha$ , then the sample does not originate from a normally distributed population.

**RESULTS AND DISCUSSION**

This research was conducted at State Elementary School 112 Palembang on November 25, 2023, from 08:00 to 11:00 AM WIB. The school is located at Jl. Sukakarya II, Sukamaju, Sako District, Palembang City, South Sumatra, Postal Code 30164. State Elementary School 112 Palembang has accreditation "B". The collection of physical fitness test data for the Pencak Silat sports branch was carried out in collaboration with the Physical Education teacher at State Elementary School 112 Palembang and also the head of the Teacher Working Group (KKG), Mr. M. Razif Al-Amien, M.Pd., who accompanied the data collection process. The data collected in this research align with the components of the Pencak Silat sports branch tests, including strength, agility, speed, flexibility, and endurance. The test instruments used to measure strength include sit-ups, agility tests use the agility T-test, speed tests involve a 30-meter sprint, and endurance tests utilize the bleep test.

The data analysis was obtained through the calculation of each norm category and data from each component of the physical fitness test. This process allows for the determination of the average physical condition of sixth-grade students at State Elementary School 112 Palembang in the Pencak Silat sports branch. For further clarity, please refer to the following table.

The data analysis was obtained through the calculation of each norm category and data from each component of the physical test. This allows us to determine the average physical condition of seventh-grade students at Indralaya 1 Public Junior High School specializing in volleyball. For a clearer understanding, please refer to the following **Table 6.**



**Table 6.** Analysis Data Results

Indicator	Category				
	Excellent	Good	Fair	Inadequate	Very Poor
Strength	0%	0%	0%	86,6%	13,3%
Agility	3,3%	6,6%	46,6%	36,6%	6,6%
Speed	3,3%	3,3%	0%	0%	93,3%
Flexibility	0%	0%	0%	0%	100%
Endurance	3,3%	10%	10%	16,6%	60%
Average	2,1%	3,98%	11,32	27,96%	54,64%

Based on **Table 6** above, the data analysis results for the physical condition of sixth-grade students at State Elementary School 112 Palembang in the Pencak Silat sports branch are as follows: the "excellent" category has an average of 2.1%, the "good" category has an average of 3.98%, the "fair" category has an average of 11.32%, the "poor" category has an average of 27.96%, and the "very poor" category has an average of 54.64%. From all the categories mentioned, it can be concluded that the average physical condition of sixth-grade students at State Elementary School 112 Palembang falls into the "very poor" category with a percentage of 54.64%.

Based on the data collected from the physical fitness tests and the measurements using the application, it is necessary to discuss the implementation of physical fitness test measurements in the Pencak Silat sports branch. This discussion aims to assist teachers or coaches in determining or organizing the results of the conducted physical fitness tests. From the data on abdominal muscle strength tests, the average obtained is 86.6% for class VI students at State Elementary School 112 Palembang. If classified, the students' abdominal muscle strength is considered lacking. This is because many students received a category K during the abdominal muscle strength test. abdominal muscle strength is determined by the quality of the muscular system/ muscles, which physiologically function to contract muscles. Muscle quality is influenced by the efficiency of muscle contractions, muscle types, and muscle fatigue. Abdominal muscle strength is the ability of a muscle or muscle group to perform one maximum contraction against resistance (Widastuti, 2015). With the results of the abdominal muscle strength test, it is expected to improve the physical condition of abdominal muscle strength through

regular exercises such as sit-ups, crunches, and planks, as abdominal muscle strength is crucial in the martial art sport of Pencak Silat.

According to Kusuma, (2016), agility is an individual's ability to change direction as quickly as possible while in motion, without losing balance and being aware of body position. Based on the data obtained from the agility test, the average is 46.6% for class VI students at State Elementary School 112 Palembang. If classified, it falls into the category of "fair." This is because the majority of students fall into category C during the agility test, meaning that the students in class VI at State Elementary School 112 Palembang, in the Pencak Silat sports branch, have a fair level of agility. It is hoped that with these test results, students can improve their agility by regularly practicing running exercises that involve T-shaped running, zigzag running, and back-and-forth running. For teachers or coaches, it is recommended to introduce more variations in tests to avoid boredom during the tests for students/athletes. Hopefully, in the future, students in class VI at State Elementary School 112 Palembang will show better results than the current ones.

Speed is one of the supporting components in Pencak Silat and can be practiced through sprinting. This is crucial for training the speed of leg muscles, which is essential for Pencak Silat kicks. According to Florin, T.D. (2018), speed is determined by the distance covered in the fastest possible sprint and the energy mobilization capacity for achieving maximum speed (100%) in a given movement. Factors influencing an individual's speed include genetics, reaction time, strength, speed technique, muscle elasticity, muscle type, concentration, and willpower. The speed when running also depends on body position, hand movements, and concentration.

Based on the data from the speed test, the average score is 93.3% for class VI students at State Elementary School 112 Palembang. If classified, it falls into the "slightly lacking" category. This is because the majority of students obtained scores in the "KS" category during the test. Therefore, students in class VI at State Elementary School 112 Palembang in the Pencak Silat sports branch need to improve their physical speed by regularly practicing short sprints at a fast pace, repeatedly. This practice will lead to better results in the future, as speed is crucial in the martial art of Pencak Silat.

Concerning flexibility, the data from the flexibility test show an average score of 100%. If classified, the majority fall into the "slightly lacking" category, as students in class VI at State

Elementary School 112 Palembang mostly scored in the "KS" category during the flexibility test. It is expected that students can improve their flexibility by regularly practicing flexibility exercises, such as doing the split with legs wide open, and performing proper stretching of the neck, shoulders, waist, and joints. According Setyawan & Setiawan (2022) flexibility is crucial in Pencak Silat training, as it helps prevent injuries and significantly influences performance during matches.

Regarding endurance, the data from the endurance test reveal an average score of 60%, which falls into the "slightly lacking" category for class VI students at State Elementary School 112 Palembang in the Pencak Silat sports branch. This is because the majority of students scored in the "KS" category during the endurance test. Students are encouraged to improve their endurance by practicing long-distance running or running for extended periods, as endurance is crucial in Pencak Silat to support the performance of students/athletes during competitions. According to Fajriyudin et al. (2021), endurance is the ability of muscles to work for a specific duration using a particular energy system, especially the aerobic endurance to utilize energy during exercise or activities.

## CONCLUSION

Based on the research findings, it is evident that the results of the physical fitness tests for sixth-grade students at State Elementary School 112 Palembang in the Pencak Silat sports branch fall into the following categories: very good with a percentage of 2.1%, good with a percentage of 3.98%, fair with a percentage of 11.32%, poor with a percentage of 27.96%, and very poor with a percentage of 54.64%. In conclusion, the average physical fitness of sixth-grade students at State Elementary School 112 Palembang is categorized as very poor, with a percentage of 54.64%. The implication of this research is to recommend the results of the physical fitness condition of State Elementary School 112 Palembang students with the assistance of the application.

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