



Implementation Physical Test Results Measurement in Athletics Short Distance Running Using Application

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Abstract

The research titled "Implementation of Measurement of Physical Test Results in Athletics Short Running for Students at State Elementary School 139 Palembang" aims to assess the physical conditions of students using applications. The study employed a quantitative descriptive method. The findings revealed that 0% of students fell into the "very good" category, while none were in the "good" category. The majority, 80%, were classified as having a "sufficient" physical condition. A smaller percentage, 17%, were in the "less" category, with no students falling into the "very poor" category. In conclusion, the physical condition of students at State Elementary School 139 Palembang is predominantly in the "sufficient" category, constituting 80%. The implications of this study underscore the need for students to heighten their awareness and efforts to enhance and maintain their physical well-being consistently, thereby improving conditions categorized as "sufficient," "less," or "lacking."

How to Cite

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INTRODUCTION

Sports The use of software in information technology is rapidly advancing in today's era. The progress in information technology can be harnessed for various purposes, including supporting sports activities. Technological advancements in the field of sports also contribute to providing information on the measurement of athletes' strength, endurance, and speed. According to the Republic of Indonesia Law Number 3 of 2005, Article 4 states that national sports aim to preserve and improve health and fitness, achievements, human quality, instill moral values, and noble qualities. It also promotes sportsmanship, discipline, strengthens national unity, enhances national resilience, and elevates the dignity of the nation.

In the present age, teachers are required to leverage modern technological developments, whether they teach Indonesian language or other subjects, including Physical Education teachers at various school levels. In the realm of sports, especially in the athletic short-distance running category, measuring the results of physical tests is a crucial factor in improving athlete performance. The physical condition in each sports discipline has different qualities and conditions, aligning with their respective characteristics. Good physical condition or performance supports athletes in achieving optimal results, whereas a low physical condition may hinder performance (Yuwono & Pramono, 2019).

Physical condition is an integral component that cannot be separated, requiring attention for both improvement and maintenance, as stated by Sujiono (2021). The physical components essential for the development of short-distance running performance include endurance, strength, flexibility, speed, and power. In athletics, particularly in short-distance running, physical conditions such as strength, speed, power, reaction speed, flexibility, and endurance after the start are crucial (Khoo et al., 2016).

To achieve maximum performance, athletes need to have physical conditions aligned with the specific event they compete in. Physical tests are conducted to assess the athletes' abilities and determine the degree of physical fitness they possess. Tests and measurements serve various purposes, such as determining status, classification, selection, motivation, maintaining standards, mechanisms, introspection, and research purposes (Hartati et al., 2022). Physical needs vary for each sports discipline, necessitating different tests and measurements for each sport. Tests and me-

asurements serve as tools to assist coaches, athletes, and sports organizations in analyzing the level of physical fitness.

The utilization of technology in sports education, such as applications for measuring physical test results, can be an enjoyable way to engage students in the learning process while increasing their interest in the sport. In the current era, technological progress is inevitable in our lives, as it advances in tandem with scientific progress. Every innovation is created to provide positive benefits to human life, offering convenience and introducing new ways of conducting various activities. This includes the field of sports, where the synergistic implementation of technology with outstanding human resources in sports is expected to be a potent concoction for achieving the goal of maximum performance.

This presents a challenge for the academic community, especially in the field of sports, to work optimally. According to Hartati (2019), technological advancements in sports have progressed, both in coaching sciences and physical testing and measurements. In the current era of globalization, physical test measurements should ideally use computer applications or software to record and calculate the entire series of tests participated in by athletes. Based on research conducted by Putra and Imam Solikin (2020) titled "Implementation of Mobile Web-Based Application for Measuring the Physical Condition of Soccer Players," it is evident that the application facilitates coaches in understanding the history of the physical condition of soccer players.

Similarly, research by Lestari & Herdyanto, (2021) on the analysis of physical test results for sprint athletes in East Java in 2019 highlights the importance of physical condition in various categories. The study suggests that manual operation of physical test result measurements often leads to human errors and inefficiencies in data management. Ideally, coaches should use tools to facilitate the monitoring process of athletes' physical development, make notes, diagnose weaknesses, and determine specific sports training programs.

Hence, the reason for the title "Implementation of Physical Test Measurement Application for Athletics Short-Distance Running Branch at State Elementary School 139 Palembang." The goal is to address the shortcomings in physical test measurements conducted by a Physical Education teacher in Palembang, specifically in the athletic short-distance running category. By implementing a physical test measurement application, the aim is to improve the quality of these measurements. The distinctive aspect of this

research is that Physical Education teachers in Palembang use an application for measuring physical test results. The application can aid in evaluating and monitoring students' progress in physical tests periodically, helping identify strengths and weaknesses and design more effective training programs. The Pedagogical Coordinating Group (KKG) in Physical Education aims to enhance the quality of sports learning in schools. The use of applications for measuring physical test results can assist teachers in creating learning programs tailored to students' needs. It streamlines data processing related to physical examination results, reducing administrative burdens and allowing teachers to focus more on the teaching and learning aspects.

METHODS

This research employs the Quantitative Descriptive Research method, which involves describing, examining, and explaining the studied phenomenon as it is, and drawing conclusions from observable phenomena using numerical data (Sugiyono., 2020). The data collection techniques utilized in this study include questionnaires (surveys), observations, and interviews. The subjects of this research are all sixth-grade students at State Elementary School 139 Palembang.

The following outlines the standardization of the assessment of physical tests in the athletic short-distance running branch, which serves as the data collection technique.

50-Meter Sprint Test

Objective: To measure the students' speed.

Equipment: Running track, whistle, stopwatch, bib numbers.

Execution:

- a. The testee stands behind the starting line, ready;
- b. With the command "ready," the testee begins running from a standing start;
- c. With the command "go," the testee runs as fast as possible, covering a distance of 50 meters to cross the finish line;
- d. The running speed is measured from the "go" command;
- e. Record the time up to a tenth of a second (0.1 seconds), if possible, note down up to a hundredth of a second (0.01 seconds);
- f. The testee performs the test twice, and the next runner conducts the test after a minimum interval of one runner. The best running speed is considered;

- g. The testee is considered unsuccessful if they cross or traverse another lane.

Assessment: Record the sprint running results based on the time taken. The following are the assessment norms for the speed test.

Table 1. 50-Meter Sprint Test for the age group of 10-12 years Norms

Category	Man (Second)	Woman (Second)
Excellent	<5,4	<5,2
Good	5,4 – 6,6	5,2 – 6,0
Adquate	6,6 – 7,2	6,0 – 6,4
Inadequate	7,2 – 9,0	6,4 – 7,6
Very Poor	>9,0	>7,6 detik

(Source: Pasaribu, 2020)

Push-Up Test

Objective: To measure abdominal muscle strength and endurance.

Equipment: Flat surface (a mat or carpet can be used), two stopwatches, Assistant to hold the feet and count.

Procedure:

- a. The starting position for the push-up movement is a body parallel to the surface with elbows bent.
- b. Upon the command "start," the participant raises their body as much as possible with arms fully extended.
- c. The body then returns to the starting position, and this cycle is repeated for 60 seconds (one minute).
- d. For males, the toes serve as the pivot point, while females use both knees crossed as the pivot point.

Participants performing perfect push-up movements are counted as test results for 60 seconds. The assessment norms for strength testing are as follows.

Table 2. Assessment Norms for Push-Up Test (10-12 years)

Category	Score	Man	Woman
Excellent	5	>23	>20
Good	4	18-22	14-19
Adquate	3	12-17	07-13
Inadequate	2	04-11	02-06
Very Poor	1	00-03	00-01

(Source: Nurhasan, 2013)

Vertical Jump Test

This test is designed to measure the explosive power of leg muscles. The equipment used includes a wall with a minimum height of 365 cm,

chalk powder, and a measuring tape. The test procedure is as follows: students stand sideways to the wall, feet together, the full sole of the foot touching the floor, and chalk powder applied to the fingertips near the wall.

The steps to conduct the vertical jump test are as follows:

- a. One hand of the student, close to the wall, reaches upward as high as possible, keeping the feet firmly on the floor. Record the achieved height at the mark of the middle fingertip.
- b. The student jumps upward as high as possible, attempting to touch the wall. Perform three jumps, marking each at the middle fingertip location.
- c. The initial position for the jump involves the sole of the foot remaining on the floor, knees slightly bent, and the hand straight, slightly behind the body.
- d. No stepping forward is allowed during the upward jump.
- e. Measure the difference between the jump height and the reach height.
- f. The student's result is the maximum difference and the height achieved from the three jumps conducted.

Table 3. Assessment Norms for Vertical Jump Test (10-12 years)

Category	Score	Man (cm)	Woman (cm)
Excellent	5	>46	>42
Good	4	38-45	34-42
Adquate	3	31-37	28-33
Inadequate	2	24-30	21-27
Very Poor	1	<24	<21

(Source: (Narlan & Juniar, 2020))

Sit-Up Test

Objective: To measure the abdominal muscle strength of an athlete.

Equipment: Flat surface (a mat or carpet can be used), two stopwatches, Assistant to hold the feet and count.

Procedure:

- a. Lie down with knees bent, feet flat on the floor, and hands folded across the chest.
- b. Begin the sit-up with the back on the floor.
- c. Lift yourself to a 90-degree position and return to the floor.
- d. The feet can be held by the partner.

Assessment: Record the number of sit-ups performed in 60 seconds. The strength assessment norms are as follows.

Table 4. Assessment Norms for Sit-Up Test (10-12 years)

Category	Score	Man	Woman
Excellent	5	>23	>20
Good	4	18-22	14-19
Adquate	3	12-17	07-13
Inadequate	2	04-11	02-06
Very Poor	1	00-03	00-01

(Source: Nurhasan, 2013)

Bleep Test

Objective: To measure the endurance of an athlete.

Equipment: Flat track, Tape measure, Cassette, and tape recorder, Cones, Stopwatch; Personnel: Distance measurer, Starter, Track supervisor, Score recorder;

Procedure:

- a. The bleep test is conducted by running a distance of 20 m back and forth.
- b. It starts with a gradually accelerating slow run, becoming faster over time until the athlete can no longer keep up with the running time rhythm.
- c. The maximum ability is determined at the level of back-and-forth at that point.

Assessment: Record the distance covered by the student in back-and-forth runs. The endurance test norms are as follows.

Table 5. Bleep Test Norms for Ages 10-14

Category	Score	Man	Woman
Excellent	5	>51	>48
Good	4	45-50	42-47
Adquate	3	40-44	36-41
Inadequate	2	35-39	33-35
Very Poor	1	<34	<32

(Source: Nurhasan, 2013)

The data analysis technique employed in this research is quantitative descriptive data analysis. In this study, the Shapiro-Wilk test is employed for normality testing, with the following criteria:

Significance level (α): 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 normality test is conducted using computer originate from a normally distributed population.

The software such as SPSS, and the percentage is calculated using the formula:

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

Source: (Setiawan & Mintarto, 2017)

Information:

P: persentase

F: frequency

N: number of cases

Once all the data has been gathered, the subsequent step involves analyzing the data to draw conclusions. The technique for calculating the results of the physical fitness tests aligns with the following **Table 6**.

Table 6. Physical Fitness Test Norms

Number	Total Score	Classification
1	22 – 25	Excellent
2	18 – 21	Good
3	14 – 17	Adquate
4	10 – 13	Inadequate
5	5 – 9	Very Poor

RESULTS AND DISCUSSION

This research was conducted at State Elementary School 139 Palembang, located in 24 Ilir, Bukit Kecil District, Palembang City, South Sumatra 30127. The collection of physical test data for the short-distance running athletic branch was carried out in collaboration with the Physical Education and Health teacher at State Elementary School 139 Palembang, who was appointed by the head of the Teacher Working Group (KKG) to assist in the data collection process for this research, namely Mr. Renno Lorian Candra W, S.Pd. The data collected in this study corresponds to the components of tests in the athletic branch of short-distance running, including endurance, speed, strength, and flexibility. The test instruments used to measure endurance include the pacer test, the speed test involves a 50-meter sprint, the strength test comprises push-ups and sit-ups, and flexibility is measured through the sit and reach test.

Table 7. Shapiro-Wilk Data Normality Test Results

Test of Normality			
Shapiro-Wilk			
	Statistic	df	Sig.
Speed	.946	30	.134
Push Up Strength	.881	30	.053
Sit Up Strength	.911	30	.016
Endurance	.949	30	.163
Vertical Jump	.930	30	.058

Based on the results presented in **Table 7** the normality test of the measured data was conducted using SPSS statistics version 29. The Shapiro-Wilk test results in the table indicate that the data have degrees of freedom (df) for a sample size of 30 individuals. To determine whether the data in the Shapiro-Wilk output are normally distributed or not, the criteria state that if the Significance value is > 0.05, the residual values are considered normally distributed; if the Significance value is < 0.05, the residual values are considered not normally distributed. The results of the speed test were 0.134, the push up strength test was 0.053, sit up strength test was 0.017, endurance test was 0.163, and vertical jump tes was 0,058, all results indicate a significance value < 0.05, thus confirming that the normality test results are considered normal.

The data analysis was obtained through the calculation of each norm category and data from each component of the physical test, allowing the determination of the average physical condition of sixth-grade students at State Elementary School 139 Palembang in the athletic branch of short-distance running. The results obtained from the tests will be presented and grouped based on the applicable categories and norms. The **Table 8** illustrates this:

Table 8. Frequency Distribution of Students' Physical Test Data

Category	Score	Frequency	Percentase
Excellent	5	0	0%
Good	4	1	3%
Adquate	3	24	80%
Inadequate	2	5	17%
Very Poor	1	0	0%
Total		30	100%

The results from the above **Table 8** provide the physical test scores, with each category assessed directly by the research on 30 students, using the reference norms for the 50-meter run, push-up test, sit-up test, bleep test, and vertical jump. The data distribution of the physical test results for students is as follows: in the "excellent" category, with a frequency of 0, resulting in a percentage of 0%; in the "good" category, with a frequency of 1, resulting in a percentage of 3%; in the "satisfactory" category, with a frequency of 24, resulting in a percentage of 80%; in the "poor" category, with a frequency of 5, resulting in a percentage of 17%; and in the "very poor" category, with a frequency of 0, resulting in a percentage

of 0%. From all the categories above, it can be concluded that the physical condition of the sixth-grade students at State Elementary School 139 Palembang falls into the "satisfactory" category, with a percentage of 80%.

This research is a quantitative descriptive study aimed at providing an objective picture or description of a condition using numerical data. It encompasses data collection, interpretation of the data, as well as presentation and analysis of the results. The study utilizes tests and measurements, which are integral components in various sports training, as they help identify the strengths and weaknesses of athletes, ultimately influencing decision-making (Hartati., 2019). The types of tests and measurements in this research include endurance components using the bleep test, strength components using push-up and sit-up tests, and the vertical jump test.

Measurement is the process of assigning numbers or efforts to achieve a numeric representation of a certain level when a student has reached specific characteristics. According to Faiz et al. (2022), measurement is generally related to the issue being measured. The measurement process begins with the preparation of testing tools and ends with obtaining test results in the form of quantitative data that can be statistically processed (Saketa & Akhmady, 2022). According to the book on testing and measurement (Mukrimaa et al., 2016), measurement is a process starting from the preparation of testing tools, implementation, and obtaining test results in the form of quantitative data processed statistically. Based on these expert opinions, it can be concluded that measurement is a process of collecting data or information about a particular individual or object, where tests and measurements serve as units that can be used as refined materials.

A test is a tool used to measure performance and collect data. A test must be valid, meaning it measures what it is intended to measure, and reliable, meaning it can be repeated multiple times (Gumantan, 2020). According to the theory of evaluation (2023), a test is an assessment method designed and given to students at a specific time, place, and condition that meets specific strict requirements. According to Abdul Narlan & Diky Tri Juniar (2020), a test is a means of obtaining data and information needed to achieve goals in both educational and performance sports. Based on the opinions of various experts, it can be concluded that a test is an instrument or tool used to gather information about individuals or subjects.

Athletics is the oldest sport and is consid-

ered the parent or mother of all sports. It consists of various events, one of which is short-distance running. Short-distance running includes the sprint of 100 meters, where athletes must run as fast as possible over a distance of 100 meters (Saputra & Indra, 2019). According to (Rahadian, 2019), in athletics, short-distance running prioritizes speed. Victory in short-distance running competitions is achieved by recording a time shorter than that of opponents. In other words, a runner must reach the finish line ahead of their competitors. In the book "Basic and Advanced Athletics" by Rahmat, (2015), short-distance running is defined as running at full speed over the specified distance.

Based on the collected data from physical fitness tests and the measurement results using applications, it is necessary to discuss the implementation of measuring the physical fitness of short-distance running in athletics using applications. The implementation aims to assist teachers or coaches in determining or organizing the physical fitness test results. The application for measuring the physical fitness of short-distance running in athletics is expected to enhance and develop biomotor abilities to the highest standards.

Short-distance running in athletics requires good physical condition. Physical condition is an integral part that cannot be separated from various components. This means that to improve physical condition, all components must be developed, although there may be prioritization depending on the status or condition of each required component (Lestari, Y. E., & Herdyanto, 2021). In this research, the physical condition of students at State Elementary School 139 Palembang is measured using TKJI (Indonesian Physical Fitness Test), which includes several test components such as the 50-meter run, push-up test, sit-up test, and bleep test. Each test component has its assessment norms. Physical fitness tests are the foundation for students at State Elementary School 139 Palembang to carry out each training session effectively and smoothly. They also support students' performance in participating in competitions. Good physical condition is expected to enable students to perform well in competitions, yielding optimal results. This aligns with the statement by Bouchard, Blair, and Haskell in Ervinto (2017), stating that "physical fitness is a set of attributes people have or achieve that relate to the ability to perform physical work." This implies that physical fitness is a holistic aspect that contributes to an individual's capability for physical activities.

The research measured the physical condition of 30 students, consisting of 16 males and 14 females. Among these students, 0% were categorized as excellent, 3% as good, 80% as fair, 17% as poor, and 0% as very poor. Based on these percentages, it can be observed that the physical condition of the students falls into the fair category. The physical condition of the students at State Elementary School 139 Palembang is attributed to a lack of exercises related to physical fitness components such as speed, endurance, strength, and other relevant tests. Therefore, teachers should pay attention to the physical condition of their students and provide exercises to improve their physical well-being.

Regarding the results of the endurance measurement using the bleep test application for sixth-grade students at State Elementary School 139 Palembang, most students are in the below-average category. Specifically, students involved in athletics, particularly in short-distance running, need to possess good endurance. Endurance is crucial for maintaining relative short-term speed, especially in activities lasting less than one minute. The lack of endurance in these students may be due to insufficient training. Hence, it is recommended that sixth-grade students in athletics at State Elementary School 139 Palembang engage in endurance exercises to achieve optimal results.

In terms of speed measurement using the Sprint 50m application, the majority of sixth-grade students at State Elementary School 139 Palembang are categorized as excellent. Speed is a dominant factor in sprinting, where the objective is to cover a specific distance as quickly as possible. The results align with the importance of speed in short-distance running. Therefore, students in athletics at State Elementary School 139 Palembang, particularly in short-distance running, exhibit a dominant speed component in their physical condition, reaching an excellent category.

The measurement of strength using push-ups and sit-ups for sixth-grade students at State Elementary School 139 Palembang shows that their strength is in the fair and very poor categories. Strength involves dynamic and explosive muscle contraction speed, as well as the release of maximum muscle strength in the shortest possible time. The lack of strength in these students may be attributed to insufficient training. Therefore, it is recommended that students in athletics at State Elementary School 139 Palembang engage in strength training for optimal results. Analyzing the data from the vertical jump test for sixth-grade

students at State Elementary School 139 Palembang indicates that their strength falls into the excellent category. All 30 students achieved a 100% frequency in the excellent category. Overall, the push-up test results for these students in athletics at State Elementary School 139 Palembang fall into the excellent category.

Summarizing the data and analysis from various physical fitness tests, including the bleep test, 50-meter sprint, push-ups, sit-ups, and vertical jump, the overall physical condition of sixth-grade students at State Elementary School 139 Palembang is considered fair. However, there are areas, particularly in endurance, that need improvement. Physical activity is a combination of various physical components, and a well-rounded approach is essential for students engaged in athletics, specifically short-distance running. The current physical condition of State Elementary School 139 Palembang students may be attributed to the lack of a precise and directed exercise program, as teachers and coaches often focus on player techniques and tactics.

CONCLUSION

Based on the research results, the physical fitness test outcomes for students in the short-distance running branch of athletics were obtained through a testing and measurement process involving four components: the 50-meter sprint test, push-up test, sit-up test, and bleep test. The results of these tests and measurements serve as a source of data and information for teachers regarding the physical condition of students during the testing and physical measurements. The physical fitness test measurements were conducted using an application, and the evaluation was directly performed by the researcher on 30 students. The results, when categorized according to the test norms—excellent with a frequency of 0 resulting in a percentage of 0%, good with a frequency of 1 resulting in a percentage of 3%, fair with a frequency of 24 resulting in a percentage of 80%, poor with a frequency of 5 resulting in a percentage of 17%, and very poor with a frequency of 0 resulting in a percentage of 0%—lead to the conclusion that the physical condition of sixth-grade students at State Elementary School 139 Palembang falls into the fair category with an 80% percentage.

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