



## Implementation Physical Test Measurement in Athletics Long Jump Event Using an Application

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### Abstract

The study, titled "Implementation of Physical Test Measurement in Pencak Silat Sports Using an Application for Students at Palembang 13 Public Junior High School," aims to establish norms for assessing physical test results in the athletics long jump event through the use of an application. The physical test components include endurance, speed, strength, muscle power, and balance assessments. This research adopts a quantitative approach with a descriptive research design. The participants consist of 20 extracurricular athletic students specializing in the long jump at Palembang 13 Public Junior High School, comprising 13 male students and 7 female students. Data collection involves various tests, utilizing specific instruments such as the bleep test for endurance, a 30-meter sprint for speed, a 1-minute push-up test for strength, a vertical jump test for muscle explosive power, and a standing stroke test for balance. The research is conducted at Palembang 13 Public Junior High School, with the collaboration of one member from the Physical Education, Sports, and Health (Pjok) MGMP in Kota Palembang. The findings from the research on extracurricular athletic students at Palembang 13 Public Junior High School indicate that the average physical condition falls into the "very good" category with a percentage of 12%, "good" with 8%, "sufficient" with 24%, "less" with 32%, and "less once" with 25%. In conclusion, the average physical condition of extracurricular students is categorized as "less" with a percentage of 32%. Following this research, the intention is to raise awareness among students to continuously enhance and maintain their physical condition to achieve optimal success.

### How to Cite

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## INTRODUCTION

Sports are all physical activities driven by the spirit to overcome oneself or others, grounded in chivalry, making sports a means towards the improvement of life quality and a nobler expression of human connection. Sports can be leveraged to elevate the dignity and prestige of a nation; when a country achieves recognition in a particular sports discipline, it becomes known internationally (Hartati., 2019). Sports encompass structured activities aimed at developing an individual's physical, mental, and social potential. It is not just a necessity but can be used to nurture individuals through competitive avenues to achieve excellence. The Basic Sports Law of 1997, Article 1, defines sports as any physical activity driven by a competitive spirit, guided by fair play principles, and aimed at enhancing the quality of life and human connections. Sports also have the potential to enhance a country's reputation as sporting achievements can bring recognition on the international stage.

Athletics is one of the oldest sports played by humans since ancient times. The term athletics has a broad meaning, including any sport that involves competition. Athletic sports include walking races, running, jumping, and throwing. Athletics, also known as track and field competitions, refer to competitions on the track and field. Long jump is one of the events included in athletics that involves elements of speed, strength, flexibility, and balance. In modern Olympics, the athletic (long jump) competition is included as a mandatory event. Aspects to consider in the long jump include maintaining speed until take-off, executing a strong and dynamic push from the takeoff point, making slight adjustments to running posture to become more upright, body positioning, and utilizing arm movements in composition.

The long jump is a movement that involves leaping by lifting both legs upward and forward in an effort to sustain the body's weight in the air as long as possible. The long jump consists of three movements: squatting, hanging, and running in the air. According to Syarifuddin in the study by Aziz and Yudi (2019), "The squat style long jump is the easiest style to perform, especially for schoolchildren, and the easiest style to learn. The movements in the long jump should be executed well and harmoniously without interruptions to achieve the farthest possible jump."

According to Aip Syarifuddin in the study by Prasetyo, (2016), "The long jump is a form of leaping movement, lifting the legs upward and

forward in an effort to carry the body's center of gravity in the air (hovering in the air) performed quickly and by pushing off on one foot to achieve the farthest distance possible." In conclusion, long jump is a leaping movement involving lifting both legs upward and forward to keep the body in the air as much as possible. This movement consists of three main stages: squatting, hanging, and running in the air. The squat style is considered the easiest to perform, especially for schoolchildren, and can be learned quickly.

To achieve optimal results in the long jump, it is crucial to maintain the smoothness and continuity of movements to avoid disruptions during the transition from one stage to the next. The goal of the long jump is to lift the legs upward and forward with a push from one foot, aiming to keep the center of gravity in the air for as long as possible, thus maximizing the jumping distance. In mastering the long jump technique, a good understanding of the movements and consistent practice is essential. By synergizing squat, hanging, and running in the air styles, an individual can achieve an effective and directed long jump.

Physical abilities in athletics are crucial for achieving good performance, particularly in the long jump discipline, where a combination of balance, speed, strength, and perfect technique is required and can be measured through a series of tests and measurements. However, commonly used physical measurement methods often have limitations in terms of efficiency, accuracy, and the ability to keep up with technological advancements. Previous research, such as "The Influence of Hurdle Jump Exercise on Squat Style Long Jump Ability in Male Students of Luwuk 1 Public Junior High School " (Nur 2019) and "The Influence of Single Leg Jump Exercise Variations on Improving Long Jump Results of Islamic Junior High School Students Al-Falah Kota Jambi" (Coaching 2019), has highlighted the importance of improvements in these measurement methods.

In an effort to overcome challenges in the development of physical test measurements in the athletic sport of long jump, there is a need for technological advancements to enhance physical test results for students. In this context, the researcher aims to develop an application for measuring long jump physical test results, prompting the research titled "Implementation of Measuring Physical Test Results in the Athletic Sport of Long Jump Using an Application on Students of Palembang 13 Public Junior High School " to be conducted. The goal is to benefit coaches and students in the long jump discipline.

Students often have to wait in long queu-

es, and manual data processing can be complicated and time-consuming. Furthermore, with technological advancements, the opportunity to implement applications becomes an attractive solution. In an effort to improve physical test measurements in the athletic sport of long jump, several technological and application changes can be considered. Firstly, the application of cutting-edge technology such as sensor devices can provide more accurate and in-depth data on students' performance in long jump. This technology can help improve the validity and reliability of measurements. Additionally, it is essential to update the applications used in measurements. The application should be responsive, user-friendly, and tailored to the needs of students and sports instructors. This ensures that the tool can be accessed and utilized by all relevant parties.

As we know, in terms of data analysis, this research can be more in-depth by comprehensively analyzing data to identify trends or patterns in students' physical test results. This information is valuable in developing more effective training programs to enhance long jump physical abilities based on the application. As mentioned by Hartati (2019), based on the results and discussions, it is concluded that the training activity using the physical test application for football athletes is highly suitable. Coaches can use the application, and coaches are willing to socialize about the physical test application to peers. This can develop the coaching profession well, which can contribute to promotions.

The implementation of physical test result measurements can also influence the development of sports lesson curricula. With more accurate and relevant results, the curriculum can be adjusted to better meet the needs of students in developing long jump skills. The learning process becomes enjoyable and entertaining. Interactive learning media capture students' attention, stimulate learning, and allow conveyed information to be correctly understood. In this case, the presence of application-based media serves as a carrier to meet the needs of the long jump learning process. The focus of the implementation is to continually develop long jump physical test results.

The goal of this research is to develop a more effective method of analyzing physical test results in the long jump discipline, especially for extracurricular students at Palembang 13 Public Junior High School. A better understanding of basic techniques, elements of speed, explosive power, and squat style long jump movements is crucial to significantly enhance students' physical capacity in the current sports context. The use of

an application is expected to simplify the process of analysis and measurement and provide broader benefits in developing students at the school.

## METHODS

The research design employed in this study is quantitative descriptive research. The method used is a survey on the measurement of physical test results. This descriptive research aims to implement an application in the Pencak Silat sports branch for students at Palembang 03 Public Junior High School to measure the results of physical conditions. These results will be used as a reference in developing training programs to determine the achievement goals. Through this implementation, an application that can be effectively applied and beneficial for users will be utilized. The research subjects refer to objects, things, people, and the location where data for the research variables are attached and questioned (Arikunto, 2015:116). The subjects in this study were conducted with the Physical Education Teacher Working Group (MGMP Pjok) of Palembang City as partners in conducting tests and measurements of the physical conditions of 20 extracurricular Pencak Silat students at Palembang 03 Public Junior High School. The sample consists of 13 male students and 7 female students participating in the Pencak Silat extracurricular. The research was conducted in two stages: the first stage involved data collection on Wednesday, November 29, 2023, at Palembang 03 Public Junior High School. The second stage included the measurement of physical test data using the application on Monday, December 1, 2023, at FKIP UNSRI Campus Km.5, Jl. Srijaya, Alang-alang Lebar District, Palembang City, South Sumatra.

The data collection techniques to be employed in this research include direct observation at the research site, namely Palembang 03 Public Junior High School. In this context, it requires test instruments and measurements to obtain the results of physical tests, which will then be input into the application to determine the norm categories of the tests conducted simultaneously. This ensures that the data or information obtained is accurate and accountable. Research instruments are tools used to collect, manage, and interpret respondent information created with the same measurement scheme (Sugiyono, 2015:156). The instrument in this research is the measurement of physical condition tests conducted with the Physical Education Teacher Working Group (MGMP Pjok) at Palembang 03 Public Junior High School. The selected tests align with the

physical components in Pencak Silat sports, including the 30-meter sprint test, T-test agility, vertical jump test, bleep test, standing stork test, and one-minute push-up test.

**30-Meter Sprint Test**

Procedure for conducting the 30-meter sprint (speed) test is as follows:

1. The athlete prepares to stand behind the starting line.
2. With the command "ready," the athlete gets ready to sprint in a crouched position.
3. With the command "go," the athlete runs as fast as possible, covering a distance of 30 meters until crossing the finish line.
4. The sprint speed is measured from the moment the "go" command is given.
5. Timing is recorded up to one-tenth of a second (0.1 seconds), and if possible, it is recorded up to one-hundredth of a second (0.01 seconds).
6. The test is performed twice. The runner takes the next test after a minimum interval of one runner. The best sprint speed is calculated.
7. Athletes are considered unsuccessful if they cross or stray across the designated track.

Assessment: Record the sprint results in correlation with the time taken. (Source: Harsuki, 2017)

**Table 1.** 30 Meter Sprint Test Norms

Norms	Man	Woman
Excellent	3.58-3.91	4.06-4.50
Good	3.92-4.34	4.51-4.96
Adquate	4.35-4.72	4.97-5.40
Inadequate	4.73-5.11	5.41-5.86
Very Poor	5.12-5.50	5.86-6.30

(Source: Harsuki, 2017)

**Bleep Test**

Equipment required for conducting the bleep test:

- 1) Bleep test recording.
- 2) Sufficient speaker or sound system for clear and audible bleep test signals.
- 3) A suitable and safe running track (non-slippery and sufficiently firm for running back and forth).
- 4) Measuring tape to determine the length of the track.
- 5) Cones or markers placed at 20-meter intervals to indicate the starting and finishing points.
- 6) Record sheets for documenting achieved levels and shuttles.

The procedure for conducting the bleep test is

straightforward. The participant or individual is required to run a distance of 20 meters back and forth. The following are the steps for implementation:

- 1) Wear appropriate shoes and clothing.
- 2) Position yourself at the starting point of the track.
- 3) Start the bleep test recording and wait for the instruction, "The Multistage Fitness Test will start in five seconds, Ready."
- 4) Begin running to the other end of the track before the signal ends and wait for the signal to run back to the starting point.
- 5) Repeat the back-and-forth running according to the given signals.
- 6) If unable to reach the end when the signal sounds, attempt to catch up in the next shuttle within two consecutive attempts.
- 7) The test concludes if the participant fails to reach the end of the track during two consecutive signals.
- 8) The final test score is determined by the level and shuttle reached before the unsuccessful attempt.
- 9) Adjust the results using the test form and norms for conversion to VO2max

**Table 2.** Bleep Test Norms

Category (Man)	Age (Year)					
	10 -14	15-19	20-29	30-39	40-49	50-59
Excellent	≥ 52	≥ 48	≥ 43	≥ 36	≥ 31	≥ 26
Good	46-51	42-47	37-42	31-35	26-30	22-25
Adquate	41-45	38-41	33-36	27-30	22-25	18-21
Inadequate	35-40	33-47	29-32	22-26	17-21	13-17
Very Poor	≤ 36	≤ 32	≤ 28	≤ 25	≤ 16	≤ 12

Category (Woman)	Age (Year)					
	10 -14	15-19	20-29	30-39	40-49	50-59
Excellent	≥ 48	≥ 42	≥ 36	≥ 29	≥ 25	≥ 19
Good	42-47	36-41	31-35	24-28	20-24	12-18
Adquate	36-41	31-35	25-30	20-23	15-19	5-11
Inadequate	33-35	27-30	21-24	15-19	7-14	3-4
Very Poor	≤ 32	≤ 26	≤ 20	≤ 14	≤ 6	≤ 2

(Source: Harsuki, 2017)

**Push-Up Test**

Objective: To measure upper body strength and endurance.

Equipment: Flat floor (mat), stopwatch, and wri-



ting utensil.

Implementation Procedure:

Starting Position:

- 1) The tester stands facing the participant, allowing one of them to be the movement counter.
- 2) The participant lies prone, placing the palms on the floor beneath the chest.
- 3) Both hands of the participant are positioned on the floor beneath their shoulders.
- 4) Elbows are maintained or locked in a straightened arm position.
- 5) The entire body remains straight, with no part of the body touching the floor except for both hands and heels. Both feet are stretched shoulder-width apart.

Execution:

- 1) The participant bends their arms, lowering the body until the chest can touch the counter's hand, then pushes back to the starting position.
- 2) The body must be kept straight throughout the movement.
- 3) The participant performs as many repetitions as possible without stopping.

Assessment: The score is based on the number of correctly executed repetitions within 60 seconds.

**Table 3.** Push Up Test Norms

Norms	Man	Woman
Perfect	>38	>21
Excellent	29-37	16-20
Good	20-28	10-15
Adquate	12-19	5-9
Inadequate	4-11	1-4

(Source: (Pasaribu, 2020b))

### Vertical Jump

Objective: To measure explosive power.

Equipment: A scaled board (cm) with dark-colored markings, measuring 30 x 150 cm, mounted on a flat wall or pole. The distance between the floor and zero on the test board is 150 cm.

Chalk powder.

Board eraser.

Writing tool.

Procedure:

Begin by applying chalk powder/magnesium carbonate to the fingertips of the participant.

The participant stands upright near the wall, feet together, with the scaled board on the right/left side of the body. Lift the hand and press it against the scaled board to leave a fingerprint.

The participant takes an initial position with arms swinging backward.

Subsequently, the participant jumps as high as possible while clapping the board with the nearest hand, leaving a mark.

Repeat this test for 3 attempts without resting or alternating with other participants.

Assessment:

Calculate the difference between the achieved jump and the standing reach.

Record the differences in test results.

Input the result with the largest difference.

**Table 4.** Vertical Jump Test Norms (cm)

Norms	Man	Woman
Perfect	>70	>48
Excellent	62-69	44-47
Good	53-61	38-43
Adquate	46-52	33-37
Inadequate	38-45	29-32

(Source: (Pasaribu, 2020b))

### Standing Stork Test

Preparations:\*\*

1. Dry location.
2. Stopwatch.
3. Assistant.
4. Writing tools.
5. Whistle.
6. Stork stand (Solatip).
7. Test officer, acting as both timekeeper and result recorder.

Terms and Instructions to be Observed:\*\*

1. In a healthy condition and ready to take the test.
2. Wear sports shoes and attire.
3. Perform warm-up exercises and understand the procedure; failure to execute any or more than one test will result in no score or failure.

Implementation: The Standing Stork Test is conducted following the method outlined by Panta et al., (2015):

1. Stand in a comfortable position.
2. Place hands on the hips.
3. Lift one leg and place the toes on the knee of the other leg.
4. Upon the assistant's command, lift the heel and stand on the toes.
5. The assistant starts counting using a stopwatch.
6. Stand for as long as possible without letting the heel touch the floor or the other foot move away from the knee.
7. The coach records the time you can maintain balance.
8. Repeat the test for the other leg.

**Table 5.** Standing Stork Test

Norms	Man	Woman
Excellent	< 51 second	< 51 second
Good	50 – 37 second	50 – 37 second
Adquate	36 – 15 second	36 – 15 second
Inadequate	< 14 second	< 14 second

(Source: (Persada., 2015))

The data analysis technique employed in this research is aimed at comprehensively clarifying, analyzing, utilizing, and drawing conclusions from the gathered data. The chosen method for data analysis is quantitative descriptive analysis. The data collected from the tests represent raw data that is then confirmed against predefined assessment standards using an application. Subsequently, the analysis involves applying data analysis techniques specific to each test item, which includes a normality test facilitated by computer software, specifically SPSS 28.

The normality test, carried out for each test item, is crucial to detect the distribution within a single variable used in the research. The normality test of the data utilizes the Shapiro-Wilk test since the sample size is less than 50, as recommended. This test is conducted to ensure that the data follows a normal distribution.

Additionally, percentages are employed in the analysis, and the formula used to derive these percentages is as follows:

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

Source: (Sudijono, 2015)

Information:

P: persentase

F: frequency

N: number of cases

100% : Fixed numbers

Normality tests serve to examine whether all variables in the study follow a normal distribution. The formula used for the normality test in this research is the Shapiro-Wilk test, assisted by the SPSS 28 program. Data is considered normal if the significance value is greater than 0.05 ( $p > 0.05$ ). Conversely, if the significance value is less than 0.05 ( $p < 0.05$ ), the data is considered not normal.

## RESULTS AND DISCUSSION

This research was conducted in the outdoor field of Palembang 13 Public Junior High School, located at Jln. Gubah, No.1, 29 Ilir Bar.

II, Palembang. The data collection for the physical tests in the athletic sport of long jump included the 30-meter sprint test for speed, push-ups for upper body strength, the bleep test for endurance, vertical jump for leg muscles, and the standing stroke test for balance.

### Shapiro-Wilk Normality Test Result

**Table 6.** Shapiro-Wilk Data Normality Test Results

	Test of Normality		
	Shapiro-Wilk		
	Statistic	df	Sig.
Endurance	.936	20	.198
Speed	.917	20	.086
Strength	.972	20	.791
Explosive Power	.967	20	.695
Balance	.964	20	.621
Balance	.959	20	.531

The normality test results were conducted to determine whether the data follows a normal distribution or not. The tested data included the 30-meter sprint test for speed, push-ups for upper body strength, the bleep test for endurance, vertical jump for leg muscle strength, and the standing stroke test for balance among the students of Palembang 13 Public Junior High School. The normality test was performed using SPSS statistics, and the Shapiro-Wilk test results are presented in the table.

Based on the data used in the normality test table, with a sample size of 20 participants, the Shapiro-Wilk test output provides information about whether the data follows a normal distribution or not. In the Shapiro-Wilk test, if the significance value (sig.) is greater than 0.05, the data is considered to follow a normal distribution. On the other hand, if the significance value is less than 0.05, the data is considered not to follow a normal distribution.

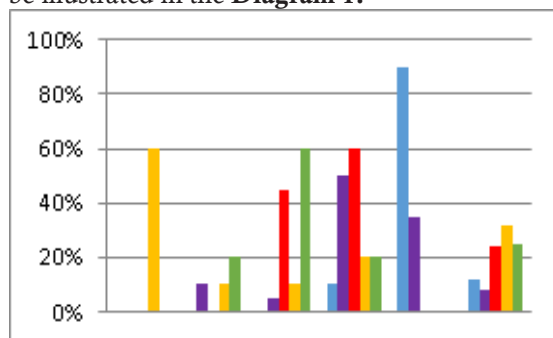
1. Endurance Test Normality Test with a significance value (sig) of 0.1 resulted in sig = 0.198.
2. Speed Test Normality Test with a significance value (sig) of 0.1 yielded sig = 0.086.
3. Strength Test Normality Test with a significance value (sig) of 0.7 resulted in sig = 0.791.
4. Explosive Power Test Normality Test with a significance value (sig) of 0.5 yielded sig = 0.695.
5. Balance Test Normality Test with a significance value (sig) of 0.5 showed sig = 0.621.

**Data Analysis Results**

**Table 7.** Data Analysis Results

Indicator	Category				
	Excel- lent	Good	Ad- quate	Inad- equate	Very Poor
Endur- ance	0%	0%	0%	10%	90%
Speed	0%	10%	5%	50%	35%
Strength	0%	0%	45%	60%	0%
Explosive Power	60%	10%	10%	20%	0%
Balance	0%	20%	60%	20%	0%
Average	12%	8%	24%	32%	25%
Average	10,8%	21,6%	41,6%	12,5%	13,3%

From the data presented in **Table 7** we can obtain an overview of the overall results of physical tests using the application norms for both male and female participants. It's important to note that each physical test has its own norm based on its application. The research categorizes the results into five categories: excellent, good, moderate, poor, and very poor. The breakdown of results for both males and females is as follows: excellent endurance, speed, strength, muscle explosive power, and balance are at 12%, good at an average of 8%, moderate/adequate at 24%, poor at 32%, and very poor at 25%. In summary, the results of the physical tests for extracurricular students of Palembang 13 Public Junior High School in the athletic long jump branch can be illustrated in the **Diagram 1**.



**Diagram 1.** Data Analysis Results

Informastion:

Blue: Endurance

Purple: Speed

Red: Strength

Orange: Muscle explosive power

Green: Balance

Therefore, it can be concluded that the highest average in the physical test for students of Palembang 13 Public Junior High School participating in the long jump extracurricular activity

falls into the "kurang" (less) category with a percentage of 32%.

This study discusses the implementation of physical fitness test measurements in the athletic long jump branch using an application for extracurricular students at Palembang 13 Public Junior High School. According to Juzinar Suhmarita (2019), an application is software or a tool designed to perform specific tasks. Onieva (2012) defines an application as the use, in a computer, of instructions or statements arranged in such a way that the computer can process input into output. The term "Web" or "site" can be interpreted as a collection of pages used to display text, still or moving images, animations, sounds, or a combination of all, whether static or dynamic, forming a series of interconnected structures, each linked by networks of pages. The study includes various physical tests such as the 30-meter sprint, push-up strength test, bleep test endurance test, vertical jump leg muscle test, and the standing stroke balance test. In terms of endurance measurement using the Bleep Test, the results indicate that both male and female students fall into the "kurang sekali" (very poor) category with a percentage of 90%, indicating a lack of endurance. This aspect is crucial for long jump athletes to maintain stamina during competitions. The lack of endurance is attributed to insufficient training, such as jogging. Measurement in the evaluation process indicates something that is accurate, objective, quantitative, and the results can be processed statistically because the data is numerical. The significance of measurement results is realized after processing and interpreting them based on the available data (Widiastuti, 2015).

For the speed measurement through the 30-meter sprint test, both male and female students are categorized as "kurang" (poor) with a percentage of 50%. The deficiency in speed is linked to the inadequate practice of physical tests, particularly sprinting. Regarding the strength measurement using the push-up test, the majority of students fall into the "kurang" (poor) category, indicating a lack of upper body strength. The study suggests that incorporating push-up exercises and other strength tests into the training regimen could address this issue. In summary, the results highlight the importance of comprehensive physical training for students participating in long jump extracurricular activities at Palembang 13 Public Junior High School. The study emphasizes the need for targeted exercises to improve endurance, speed, and strength, ultimately enhancing the overall athletic performance of the

students. ngoning with the context of long jump performance, the speed of muscle contraction also contributes to improving step frequency, ultimately enhancing overall long jump performance (Hasanuddin, 2021).

Based on the results of muscle explosive power measurements conducted on students of Palembang 13 Public Junior High School participating in the athletic extracurricular activity, the vertical jump test was employed using norms specified in the application created by Prof. Dr. Dra. Hj. Hartati, M.Kes. The guidelines for the test were followed according to Pasaribu, (2020). The results revealed that 60% of male and female students fell into the "baik sekali" (very good) category, 10% into the "baik" (good) category, 10% into the "sedang" (moderate) category, and 20% into the "kurang" (poor) category, with none in the "kurang sekali" (very poor) category. According to Mita (2016), "Having good muscle explosive power is a crucial factor that supports the execution of techniques, especially techniques that rely on leg muscle strength." This strength is vital for students participating in the long jump extracurricular activity as muscle explosive power aids in executing successful jumps.

In the measurement of balance conducted on students of Palembang 13 Public Junior High School participating in the long jump extracurricular activity using the standing stroke test, the results showed that 20% fell into the "baik" (good) category, 60% into the "sedang" (moderate) category, and 20% into the "kurang" (poor) category, with none in the "baik sekali" (very good) or "kurang sekali" (very poor) categories. Balance is crucial in long jump execution due to the frequent jumping involved. The majority of students scored in the "kurang" (poor) category, indicating room for improvement.

## CONCLUSION

Based on the description and analysis of the research on the "Implementation of Physical Fitness Measurement in the Athletic Long Jump Discipline Using an Application for Students of Palembang 13 Public Junior High School," the testing results of the application were obtained. When the admin accessed the web application, it was successful. This application for measuring the results of physical fitness tests in the athletic long jump discipline is useful for evaluating students' physical fitness with predefined norms. The web-based application streamlines the process of measuring students' physical conditions. With this application, there is no need to was-

te time manually checking physical test norms. Once student data and the sports discipline are entered, the application immediately displays the results of the physical test, indicating the quality of the students' physical fitness.

Based on the entire series of tests, including the Bleep test, Push Up, 30-meter run, and Vertical jump, the overall average results mostly fall into the "less" category. Specifically, the distribution is as follows: "excellent" category 12%, "good" category averages 8%, "moderate" category 24%, "less" category 32%, and "very less" category 25%.

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