Development Of Fitness Test Results Measurement For Karate Sports Based On Application

Maryani[1], Hartati[,2*], Iyakrus[3], Herri Yusfi[4], Meirizal Usra[5]

[1,2,3,4,5]Master of Sports Education, Teacher Training and Education, Sriwijaya University, Palembang, Indonesia

Article Info

Abstract

This research aims to develop a product in the form of a technology-based application to measure physical fitness test results. This research produced an application for measuring physical fitness test results. The study employed the ADDIE development research method, which consists of the stages of analysis, design, development, implementation, and evaluation. The research subjects were 30 students from junior high school 1 Indralaya, consisting of 20 male students and 10 female students. The study was validated by three experts: a karate sports test and measurement expert (94%, categorized as very feasible), a language expert (82%, categorized as very feasible), and an application expert (97%, categorized as very feasible), using questionnaires containing various questions. The average result from these three validations was 91%, indicating that the application for measuring physical fitness test results in the karate sports branch is feasible to use. However, based on the statistical trial results, the normality test was 0.233, the homogeneity test was 0.118, and the independent sample t-test was 0.118. These results led to the conclusion that the application-based measurement of physical fitness test results developed in this study is valid and effective, making it suitable for use in teaching and learning activities.

INTRODUCTION

Measuring physical fitness test results is an interesting topic to develop, especially in the context of the sport of karate (Muhammad Willy Febriyanto et al., 2022). Current applications do not have a physical fitness test instrument specifically designed for karate (PUTRA & IMAM SOLIKIN, 2020). Therefore, a new application is planned to facilitate the measurement of physical fitness test results for karate athletes. This application is expected to make it easier for users to view test results quickly and effectively without having to do manual calculations. The advantages of the application to be developed include the availability of test instruments that are in accordance with the needs and norms specific to karate (Hartati et al., 2019).

Sports, especially physical fitness, play an important role in everyday life and in supporting sports activities. Each component of physical fitness, such as muscle endurance, strength, flexibility, and balance, plays a role in the physical aspect. According to (Wahyuni et al., 2022) physical activity is a multidimensional behavior that involves body movement, which contributes to increased energy and physical fitness. Physical fitness includes two aspects, namely health fitness and skills. In addition, regular physical activity can increase endurance and prevent obesity. There are two types of physical activity: active and inactive, where active individuals engage in heavy or moderate physical activities regularly, while inactive individuals only do physical activity sporadically or not at all (ZEFITER & IRAWAN, 2020). Physical tests are carried out to measure the body's ability to be physically and mentally healthy, which reflects the individual's physical capabilities (HARTATI & KURDI, 2024). In the context of sports, tests and measurements are important parts used to assess the strengths and weaknesses of an athlete or student, which will later help in making the right decisions (Hartati et al., 2018). Measurement is a quantitative process resulting from a test, and evaluation is the interpretation of the data obtained. Physical tests in sports include testing strength, speed, balance, flexibility, coordination, endurance, muscle strength, reaction, and agility (Gumantan et al., 2021). In karate, physical tests include components such as strength, speed, agility, leg muscle explosive power, aerobic endurance, and flexibility (Hartati et al., 2020). Good physical condition is essential to master sports techniques and achieve maximum performance (Redho et al., 2023).

The development of this application is important because it can make it easier for the public, coaches, teachers, and students to understand the results of physical fitness tests in karate, as well as facilitate the implementation of the test. According to (Nurdyansyah, 2017) the use of technology in sports greatly helps improve muscle ability and capacity, which has an impact on increasing fitness.

Researchers observed 20 students of junior high school 1 Indralaya with two testers, and the results of the analysis showed a significant difference between measurements using a stopwatch, with an average difference of 1.2 seconds. From these results, researchers are interested in developing a physical fitness test instrument for karate based on an application.

According to (Hartati et al., 2020) in this modern era, it is undeniable that science and technology (IPTEK) are closely related to human life, including in the world of sports. The use of IPTEK, especially for athletes, can help improve muscle work ability and capacity. With the right application of IPTEK, a person's physical fitness, including athletes, can be improved. Therefore, the development of IPTEK must be carried out optimally. In the context of this study, application support for physical fitness tests and measurements is also very important. Applications, as software designed to meet the needs of various human activities such as business, advertising, public services, and others (Susanty et al., 2019), in this study are used to document and calculate physical fitness test results in accordance with applicable norms and rules. Researchers believe that by developing this application, documenting test results will be easier, although there are shortcomings such as the high cost of making the tool. In addition, Akbar also suggested that similar research be developed further. Based on the explanation and existing problems, researchers are interested in designing

and developing test instruments and technology-based applications to measure physical fitness test results in the sport of karate. Therefore, the researcher plans to conduct a study entitled "Development of Physical Fitness Test Results Measurement for Karate Sports Branches for Students of Junior high school 1 indralaya Based on Applications".

METHODS

This study uses the Research and Development (R&D) method. The development steps use the ADDIE model which includes several stages, such as problem identification, goal setting, design and prototyping, testing and evaluation, and implementation and assessment. (Sugiyono, 2019). This study uses quantitative and qualitative data analysis techniques. Quantitative data is shown in the management of validation and observation questionnaires and qualitative data based on input and suggestions from validation experts regarding product design. This study was conducted on 30 students of class VIII junior high school 1 Indralaya.

Participants

Appropriate identification of research participants is critical to the science and practice of psychology and/or social sciences, particularly for generalizing the findings, making comparisons across replications, and using the evidence in research synthesis and secondary data analysis. Identification of the samples of participants major demographic characteristics for humans, such as age;

sex; ethnics and/or racial group; level of education; socioeconomic; generational, or immigrant status; disability status; sexual orientation; gender identity; and language preference as well as important topic-specific characteristics.

Sampling Procedures

The population and sample in this study were categorized to be used as a small-scale product trial of 15 students of class VIII at junior high school 39 Palembang. Furthermore, needs analysis was conducted by taking a large-scale sample of 30 students of class VIII at junior high school 1 Indralaya.

Materials and Apparatus

In preparing your manuscript, you need to tell the reader about materials (e.g., questionnaires, stimulus words) and apparatus (e.g., devices to record data, surgical implements) that you used. In general, if researchers are likely to be familiar with your materials and apparatus, you need only mention them. But if you created your own materials, you should give a very detailed depiction of them. If you are using relatively unknown materials or apparatus created by others, you should provide a description of them and indicate to the reader where to obtain them. If you used personality inventories or questionnaires, it is a good idea to indicate levels of reliability reported by previous researchers.

Procedures

The techniques and instruments that will be used in collecting data from expert validation are test and measurement experts, media experts, and language experts. Then the results of the expert validation are tested on a small and large scale.
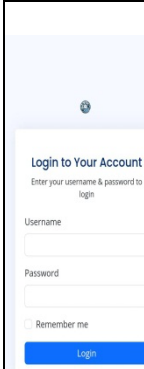
Design or Data Analysis

Data analysis in this study adopted quantitative descriptive techniques to process the data obtained in the form of percentages, which were then discussed descriptively based on a clear theoretical basis. The purpose of this data analysis is to describe the characteristics of the data from each variable (Sugiyono, 2019). Based on this, the data analysis section is divided into two parts, namely expert data validation analysis and student respondent data.

RESULT

Initial Product is the first step in creating an application. The goal is to obtain a basic plan of the instrument to be created. At this stage, the researcher ensures the components used in the development of a technology-based karate fitness test measurement application. This application is named "Karate Fitness Test Results Application" and includes five test instruments and test results, which are important parts in the development of this application. This application is also equipped with a feature to print test results.

Figure 1. Product Design

| Initial view of the application | Dashboard View | Display Test data results |

The finished product was then subjected to validation tests by karate sports experts, application media experts and language experts with the following results:

Table 1. Expert Validation

No	Expert Validation	*f*	N	*p*(%)	Eligibility Category
1	Karate Sports Branch	97	100	97%	Very Good/Decent
2	Application Media	82	100	82%	Good/Decent
3	Language	100	100	100%	Very Good/Decent

Based on the table above from the validation of sports test and measurement experts, there is an average of 89.5% of the development products of technology-based karate sports physical fitness test measurement products that are suitable for use in the field of sports. The validator also provides suggestions for this product, namely (1.) This application is suitable for use as an instrument to measure test results. (2.) As an alternative tool in calculating physical fitness test results. (3.) This application is very helpful in implementing physical fitness tests, because it does not require a lot of manpower or manual measuring instruments and stationery. (4.) Take advantage of the latest technology further.
Small-scale trial

The trial was conducted to determine the results of the effectiveness of the test result application in storing, calculating and managing physical fitness test results with manual ones. The trial was conducted on 15 students in class VIII at SMP 39 Palembang. The data obtained was processed using SPSS 22 to test data normality, homogeneity and paired sample tests to determine whether there were significant differences in the product.

Normality Test

The normality test aims to determine whether the residual value is normally distributed or not. Here is the one-simple kolmogrov-smirnov test

Table 2. Normality Test

Variabel	t-statisitik	Sig	Information
Tes Digital	0,163	0,200	Normal

Based on the testing criteria if the Asymp. Sig (2-tailed) value > 0.05 then the residual value is normally distributed and if the Asymp. Sig (2-tailed) value < 0.05 then the residual value is not normally distributed. So based on the table above, the Asymp. Sig (2-tailed) value is 0.200 > 0.05 it can be concluded that the trial sample data is normally distributed so that the homogeneity analysis can be continued.

Table 3. Homogeneity Test

Variabel	Sig.	Conclusion
Tes Digital	0,188	Homogen

Based on the test criteria if the Sig. value > 0.05 then the data distribution is homogeneous and if the Sig. value < 0.05 then the data distribution is not homogeneous. So based on the table above, the Sig. value is obtained. 0.188> 0.05 it can be concluded that the manual test data and small group digital tests have homogeneous variance so that the analysis of activity can be continued using the independent sample test

Table 4. Independent Sample Test

Variabel	t-hitung	Sig.	Level Of Significant
Manual test – Digital test	0,000	0,188	0,05

Based on the test criteria if the Sig. (2-tailed) value <0.05, then there is a

significant difference between the results of the manual test data and the digital test and if the Sig. (2-tailed) value> 0.05 then there is a significant difference between the results of the pretest and posttest data. So based on the table above, the Sig. (2-tailed) value is 0.188> 0.05 it can be concluded that there is no significant difference between the results of the manual and digital tests.

So from the results of the three statistical tests above, it can be concluded that the karate technology-based physical fitness test can be used as a test aid.

Large-Scale Trial

After the small-scale trial was completed, a large-scale trial was continued, the purpose of which was also to determine the results of the effectiveness of the physical fitness test application in storing, calculating and managing test results manually. The trial was conducted on 30 students in class VIII at SMP Negeri 1 Indralaya. The data obtained were processed using SPSS 22 to test data normality, homogeneity and paired sample tests to determine whether there were significant differences in the product.

Normality Test

The normality test aims to determine whether the residual value is normally distributed or not in large-scale trial data.

Table 5. Normality Test

Variabel	t-statisitik	Sig	Information
Tes Digital	0,955	0,233	Normal

Based on the testing criteria if the Asymp. Sig (2-tailed) value > 0.05 then the residual value is normally distributed and if the Asymp. Sig (2-tailed) value < 0.05 then the residual value is not normally distributed. So based on the table above, the Asymp. Sig (2-tailed) value is 0.233 > 0.05 it can be concluded that the trial sample data is normally distributed so that the homogeneity analysis can be continued.

Table 6. Homogeneity Test

Variabel	Sig.	Conclusion
Tes Digital	0,118	Homogen

Based on the test criteria if the Sig. value > 0.05 then the data distribution is homogeneous and if the Sig. value < 0.05 then the data distribution is not homogeneous. So based on the table above, the Sig. value is 0.118> 0.05 it can be concluded that the manual test data and small group digital tests have homogeneous variance so that the analysis of activity can be continued using the independent sample test.

Table 7. Independent Sample Test

Variabel	t-hitung	Sig.	Level Of Significant
Manual test – Digital test	0,000	0,118	0,05

Based on the test criteria if the Sig. (2-tailed) value <0.05, then there is a significant difference between the results of the manual test data and the digital test and if the Sig. (2-tailed) value > 0.05 then there is a significant difference between the results of the pretest and posttest data. So based on the table above, the Sig. (2-tailed) value is 0118> 0.05 it can be concluded that there is no significant difference between the results of the manual and digital tests.

So from the results of the three statistical tests above, it can be concluded that the karate technology-based physical fitness test can be used as a test aid.

DISCUSSION

Research on the development of a karate sports fitness test result measurement application shows that this application is quite suitable for use as a tool to measure and store test results in the world of sports and education. The findings of this study are in line with previous studies which show that the advantages of this application lie in higher measurement accuracy and better time effectiveness (Komaini et al., 2018). In addition, the results of this study also support the findings that the developed test instrument has a high level of validity and reliability.

In the initial stage, this study involved a product needs analysis, which is important for making decisions regarding the development of a digital agility test tool (Ramadhan et al., 2021). The researcher conducted observations of teachers and students at SMPN 1 Indralaya, and the results showed that 64% of respondents agreed to further develop the measurement of karate sports fitness test results.

Based on the needs analysis, the researcher formulated the stages and test rules and began the initial design of the Illinois agility measurement test tool and application (Jamaluddin, 2019). After establishing the necessary rules, the researcher proceeded to the stage of creating a test application and measuring the results of the karate sport physical fitness test, involving electronics experts from AIT, Faculty of Computer Science, Sriwijaya University.

The results of the study were obtained through effectiveness tests, validity tests, and practicality tests. The results of the validity test showed that this application had a questionnaire score of 97% from sports test and measurement experts, 82% from electronic media experts, and 100% from application experts. The average validity score from the three experts was 93%, which indicates that this application is very suitable for use as a physical fitness test measurement tool.

In the large-scale trial stage, the Independent Sample Test was used to measure the effectiveness of the tool by comparing the use of the application and manual measurements. The test results showed a value of 0.118> 0.05, which means there is no significant difference between the use of the digital agility measurement test application and manual measurements (Prameswari & Rahayu, 2020).

This study emphasizes the importance of the role of technology in the development of sports in the modern era. Technology can optimize various aspects of sports, such as estimating the volume and intensity of training programs and rest times, which can be adjusted to the desired results (Iyakrus et al., 2021). In addition, in the 21st century, teachers are expected to be able to utilize digital technology to design more creative and innovative learning (Rusdiana & Ruhayati, 2017). Science and technology in sports can be applied in various fields, from management, athlete profile data collection, to digital

broadcasting of matches both online and offline (Kurniawan, 2021).

According to (Raya et al., 2013), technological advances have had a significant impact on community participation in various sports activities, both in the context of education, achievement, and recreational sports. Each stage of the industrial revolution has had a broad influence on various sectors, including in the field of sports. This can be seen in the discovery of digital test tools that can measure accurately, digital weight machines, applications that can evaluate errors in movement techniques from various sports, as well as digital tools that can help predict and direct individuals to choose the right sport. In addition, technology also supports the process of coaching high-achieving athletes. According to (Komaini et al., 2018), the application of advanced technology in sports disciplines functions as an analysis tool in a particular sport to improve performance.

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that the product resulting from the development of a technology-based karate sport physical fitness test result measurement application is valid, practical, and effective. The results of the validity test from three experts showed an average of 93%, indicating that this application is valid. Furthermore, a practical value of 90% indicates that this application is practical to use. In addition,

the product test showed a normal data distribution in the normality test, homogeneous data variance in the homogeneity test, and there was no significant difference between the measurement of test results using the application and manual measurement based on the Independent Sample T-test, which stated that this application is less effective. Therefore, it can be concluded that this application-based karate sport physical fitness test result measurement application is very suitable for use in the fields of sports and education.

REFERENCES

Gumantan, A., Mahfud, I., & Yuliandra, R. (2021). Pengembangan Alat Ukur Tes Fisik dan Keterampilan Cabang Olahraga Futsal berbasis Desktop Program. *Journal of Sport Science and Education) |*, *6*(2), 146–155. https://doi.org/10.26740/j

Hartati, Aryanti, S., & Victorian, A. R. (2020). *Development of Physical Test Applications Basketball Sports Model in Regional Student Education and Training Center Hartati Physical Education and Health FKIP Universitas Sriwijaya*.

Hartati, Destriana, Aryanti, S., & Destriani. (2018). *Macro Flash-based Multimedia for Improvement of The Learning Result of Volleyball Game*.

Hartati, F. A., & Kurdi, F. N. (2024). Development of Web-Based Media for Sports Physical Tests. *Journal of Physical Education, Sport, Health and Recreation*, *13*(2), 214–219. https://journal.unnes.ac.id/journals/peshr

Hartati, Vivtoriand, A. R., Yusfi Herry, & Destriani. (2019). Pelatihan Penggunaan Aplikasi Tes Fisik Untuk

Pelatih Sekolah Sepakbola Di Bawah Binaan KONI Ogan Ilir. *Jurnal Of Sport Education*, *1*(2), 34–36.

Iyakrus, Destriani, & Shabih, M. I. (2021). Latihan Zig-Zag Terhadap Kelincahan Menggiring Bola Pada Atlet Sepak Bola. *Jurnal Kejaora (Kesehatan Jasmani Dan Olah Raga)*, *6*(1), 145–152. https://doi.org/10.36526/kejaora.v6i1.1289

Jamaluddin, H. I. M. (2019). *Pengaruh Latihan Pola Hexagonal Berbasis Teknologi Terhadap Peningkatan Kelincahan Beladiri Tarung Derajat Lombok Timur*. http://ejournal.mandalanursa.org/index.php/JUPE/index

Komaini, A., Sahri, J., & Tohidin, D. (2018). Pengembangan Instrumen Tes Kelentukan Statis Berbasis Teknologi Sensor. *Jurnal Sosioteknologi*, *17*(3), 343–349. https://doi.org/10.5614/sostek.itbj.2018.17.3.1

Kurniawan, I. (2021). *Pengembangan Alat Tes Sit Up Berbasis Teknologi Sensor Pada Tim Sepakbola Garuda Muda Ogan Komering Ulu*.

Muhammad Willy Febriyanto, Pungki Indarto, & Nurhidayat, N. (2022). Analisis Kebugaran Jasmani Siswa Kelas 10 TJKT SMK Negeri 1 Klaten Dengan Menggunakan Tes Kebugaran Pelajar Nusantara Tahun Ajaran 2022/2023. *Indonesian Journal of Sport Science and Technology (IJST)*, *1*(2), 67–74. https://doi.org/10.31316/ijst.v1i2.6010

Nurdyansyah. (2017). *Sumber Daya dalam Teknologi Pendidikan*.

Putra, M. S., & Imam Solikin. (2020). Implementasi Aplikasi Pengukuran Kondisi Fisik Pemain Sepak Bola Berbasis Web Mobile. *IT Journal Research and Development*, *5*(2), 135–146.

https://doi.org/10.25299/itjrd.2021.vol5(2).5281

Ramadhan, A. A. R., Syafaruddin, S., & Aryanti, S. (2021). Profil Minat Peserta Didik Terhadap Permainan Bola Voli. *Bravo's : Jurnal Program Studi Pendidikan Jasmani Dan Kesehatan*, *9*(2), 41. https://doi.org/10.32682/bravos.v9i2.1846

Raya, M. A., Gailey, R. S., Gaunaurd, I. A., Jayne, D. M., Campbell, S. M., Gagne, E., Manrique, P. G., Muller, D. G., & Tucker, C. (2013). Comparison of three agility tests with male servicemembers: Edgren Side Step Test, T-Test, and Illinois Agility Test. *Journal of Rehabilitation Research and Development*, *50*(7), 951–960. https://doi.org/10.1682/JRRD.2012.05.0096

Redho, M., Hartati, & Aryanti, S. (2023). Development of a Web-based Physical Education Digital Library. *Journal of Physical Education, Health*, *10*(2), 134–139. http://journal.unnes.ac.id/nju/index.php/jpehs

Rusdiana, E., & Ruhayati, A. (2017). Pengembangan Teknologi Tes Chin Up Berbasis Arduino Uno dan Sensor Laser Infrared Dengan LCD Display. In *Jurnal Terapan Ilmu Keolahragaan* (Vol. 02).

Sugiyono. (2019). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. *Alfabeta Bandung*.

Susanty, W., Nanda, A. I., & Thamrin, T. (2019). Aplikasi GIS Menggunakan Metode Location Based Service (LBS) Berbasis Android. *Jurnal Sistem Informasi Dan Telematika*, *10*(1).

Wahyuni, S., Irawadi, H., & Setiawan, Y. (2022). *Tingkat Kondisi Fisik Khusus Atlet Taekwondo*.

Zefiter, I., & Irawan, R. (2020). *Modifikasi Instrumen Hexagonal Drill Test untuk Kelincahan (Studi Uji Validitas Dan Reliabilitas)*.