Effectiveness of software for Indonesian martial art

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Abstract. This study aims to: determine the effectiveness of the use of physical test results processing software for martial art adolescents in the match category. This type of research uses the quasi-experiment method. The sampling method uses purposive sampling. The effectiveness test involved 6 trainers and 88 martial art athletes. Data analysis for validity and reliability of physical test instruments using the Pearson correlation calculation, while the effectiveness test of the use of software using paired sample t-test, operated through SPSS 16. Tests were declared valid and reliable with p <0.05. The effectiveness of the instrument seen from the percentage of the coach's assessment in the good and very good category. While the use of software was declared effective with p <0.05.

1. Introduction
Tests and measurements are an important science in order to support sports coaching [1]. The goal of coaching itself is in order to foster athletes to achieve the desired peak performance. There are several aspects that need guidance in order to achieve an athlete's peak performance. Among them are physical, technical, tactic and mental aspects [2] said: "The stronger the physical foundation, the greater the potential for developing technical, tactical, and psychological attributes". Thus, guidance on physical aspects can affect the technical, tactical and mental appearance of a sports athlete. In addition to ongoing coaching regarding some aspects needed in certain sports, other things are needed in order to support the development of sports achievements. This is related to technology. In the field of sports, especially martial art, many have used various kinds of technology, one of which is information technology. The utilization of this information technology can be seen from the use of digitization systems in the assessment of the category of martial art.

Habib Honary [3] said that "Information technology as other technologies can be the relationship between hardware, software, networks and capabilities of these tools and measures that can be defined due. Haag (1994) says "the following issues representing the body of knowledge of information: information linguistics, information politics, information psychology, information sociology, information technology and information norming.

In other words, the existence of information technology can support sports information activities such as making hardware, software, networks, databases relating to sports. Various technologies are made in addition to simplifying work, of course, there are other things that must be considered, namely in terms of economics, the efficiency of use and so forth. In a journal of sports, recreation and dance education, Ross and Sharpless [4], suggested: "technological innovation is creating faster,
smaller, more reliable, and less expensive computers, giving the most recreation and sports agencies and employees access to their benefits”.

With regard to Pressman software [5] provides the following understanding: Software is: (1) instructions (computer programs) that when executed provide desired features, functions, and performance; (2) data structures that enable programs to manipulate information, and (3) descriptive information in both hard copy and virtual forms that describe the operation and use of the programs. Software is one solution to facilitate sports-related matters which include sports equipment that supports the continuity of particular sports activity.

In an ICPST journal written by Han Can [6] said the following: A wide range of applications of information technology in sports venues have made great contributions to our sports and mass sports development. It is precisely the modern information technology support that makes the development of various service-oriented sports products possible, such as fitness equipment, scoring equipment, related software, sports management, sports, and other electronic databases, which have contributed to China’s sports venues, the development of intelligent information.

Along with advances in technology, martial art as one of the original Indonesian martial arts sports also requires appropriate technology to simplify the process of competition, the process of evaluating training in order to improve prime conditions while competing and also other matters relating to the process of improving the desired performance. Regarding the evaluation of the physical condition of martial arts athletes, there are still many manual processes. This makes the physical evaluation process less efficient and efficient, so a solution is needed in the form of digitizing the process of evaluating martial art. However, digitizing the process of evaluating martial art is not enough. Further effort is needed to test whether the evaluation digitalization process is capable of carrying out its functions properly or not through product effectiveness testing.

2. Method
This research uses a quasi-experiment research method. Samples are asked to enter physical test data manually and using the software. Furthermore, a comparison of the time needed to get the results of the manual and digital-physical test decisions. The method of sampling in this study used purposive sampling, namely the method of taking with certain considerations. The subjects tried to test the effectiveness of 6 trainers as product users and 88 martial art athletes as testes to obtain physical test data. The number of test items consisted of flexibility tests (sit and reach), (2) speed (30 meter sprint), (3) arm strength (push up 30 seconds), (4) leg strength (wall sit test), (5) agility (sidestep), (6) leg power (standing broad jump), (7) anaerobic endurance (300 meter sprint), and (8) aerobic endurance (multi fitness test). Data from the physical test results that have been obtained are then processed manually as well as digitally processed using software that has been made to obtain a decision on the results of the physical tests of each athlete.

Data processing techniques use quantitative data analysis techniques with paired sample t-test tests that are operated through SPSS 16 to determine the effectiveness of software usage. There were 5 decisions on the test results from the processing of physical tests from each athlete, namely very good, good, moderate, lacking and very lacking. The physical test data processing process is measured using a timer to get the length of time needed to get a test result decision that is processed manually or digitally through software that has been created.

3. Result
3.1. Effectiveness test results of physical test software for Martial art adolescent match category
Before making physical test software Martial art Teen category, the researchers compiled 9 physical items for a teenage martial art in the category of competition through Focus Group Discussion to get input from experts. In addition, 9 physical test instruments which included sit and reach, 30-meter run, 30 seconds push up, wall sit test, sidestep, leg power, standing broad jump, 300-meter run and multi fitness test also received validation, from experts. Furthermore, 9 physical items that have been made
are also equipped with test norms. The following will show the results of the validity and reliability of instruments that have been compiled.

**Table 1.** Test Results for Validity of Instruments for Men and Daughters of Physical Martial art Tests in the Match Category

| Instrument                  | Probability The | Description of |
|-----------------------------|-----------------|----------------|
| sit and reach               |                 | Valid          |
| 30 m sprint                 |                 | Valid          |
| 30-second pushup            |                 | Valid          |
| wall sit test               |                 | Valid          |
| wall sit test               | P <0.05         | Valid          |
| sidestep                    |                 | Valid          |
| standing broad jump         |                 | Valid          |
| of 300 m sprint             |                 | Valid          |
| multi fitness test          |                 | Invalid        |

**Table 2.** Results of test Reliability Tests Physical Instrument Martial art Young Men and daughter Category Slam

| Instrument                  | Probability | Description |
|-----------------------------|-------------|-------------|
| sit and reach               |             | Reliability of |
| 30 m sprint                 |             | reliability |
| 30 second pushup            |             | Reliability |
| wall sit test               |             | Reliability |
| wall sit test               | P < 0.05    | Reliable    |
| side step                   |             | Reliable    |
| standing broad jump         |             | Reliability |
| 300 m sprint                |             | Reliable    |
| multi fitness test          |             | Reliability |

Tables 1 and 2 above are validity and reliability test results that show values p <0.05. These results can be concluded that the overall physical test instruments of martial art for young men and women in the match category were declared **valid and reliable**.

In connection with the results of the effectiveness of software use test, the following is provided comparison data of time in seconds needed by the trainer to get the criteria for the results of the physical test of Martial art adolescence in the match category manually or through the use of physical test software that has been made.
Table 3. Comparison of Time to Obtain Test Result Criteria Using Software and Without Using Software

| Respondentto | Using Software | Without Software |
|--------------|----------------|------------------|
| 1            | 5              | 12               |
| 2            | 11.26          | 19.08            |
| 3            | 9.5            | 18.02            |
| 4            | 10.14          | 21.09            |
| 5            | 13.8           | 22.6             |
| 6            | 12.9           | 20.05            |
| Average      | 10.4           | 18.8             |

For knowing the effectiveness of the use of software related to the time needed to get the test score criteria to need to be tested by paired sample t-test to test the mean differences possessed by the same subject. After paired sample t-test using SPSS 16, the probability value (p) is 0.000. So that it can be concluded p <0.05. Thus, based on the results of the t test it can be said that using the software is more effective than without using the software.

4. Conclusion
The physical test of martial art in the rival category has 9 physical test items. The items are then inserted into the software to make it easier for the trainer to get the results of the physical test and facilitate the trainer's evaluation process for martial arts athletes who have problems with the results of physical tests. To see whether this software really facilitates the trainer, the effectiveness of the use of the martial art juvenile physical test software has been tested. The results of the analysis show that the software made effective is used as a training tool to evaluate the physical condition of the youth martial arts athletes in the match category.

Acknowledgments
On this occasion, the author would like to express his deepest gratitude to all parties, who have provided assistance in the form of guidance, direction, motivation and prayer during the research process: a) Chancellor of Musamus Merauke University and staff who have helped researchers so much this research was realized; b) To the Coaching Staff and members of the DIY KONI, for permission, opportunities, assistance, and cooperation; c) along with all parties that I cannot mention one by one, who have provided assistance in conducting research and compiling data in this study.

References
[1] Boreham C 2006 Advances in Sport and Exercise Science Series, The Physiology of Training Churchill Livingstone Elsevier, UK 436
[2] Bompa T O and Buzzichelli C 2018 Periodization:- theory and methodology of training (Human kinetics)
[3] Honari H 2011 Information Technology in Professional Sports International Conference on Environmental, Biomedical and Biotechnology, singapooro, IPCBEE vol 16
[4] Ross C M and Sharpless D R 1999 Innovative information technology and its impact on recreation and sport programming J. Phys. Educ. Recreat. Danc. 70 26–30
[5] Pressman R 2010 Software engineering vol 7 ed I McGraw-Hill Compenies (New York: McGraw-Hill Compenies, Inc)
[6] Cheon Y-S 1981 Software Engineering ETRI J. 3 3–10