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Development of Pencak Silat Collaboration Test Instruments for Pencak Silat Athletes in Jambi City

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Abstract: In this research journal, the writer or researcher wants to conduct research on the Development of a Pencak Silat Punch and Kick Collaborative Test Instrument for Pencak Silat Athletes in the City of Jambi. The method used in this research is research and development. The sample used was 16 pencak silat athletes in Jambi City. The results of the study "Development of a Pencak Silat Punch and Kick Collaborative Test Instrument for Jambi City Athletes" were categorized as suitable as a punch and kick collaboration test instrument that could measure the speed and strength of each the punches and kicks of Jambi City's pencak silat athletes. This can be seen from the results of the assessment of media experts, namely 91.88%, test and measurement experts 100.00%, and material experts in pencak silat 100.00% and based on the results of medium-scale trials, namely 96.30%.

Keywords: Athletes, Collaboration Test Instrument, Pencak Silat, Punch and Kick

A. Introduction

Pencak silat is one of the original cultures of the Indonesian nation, in which the warriors and experts in pencak silat strongly believe that the Malay community at that time created and used this martial art since prehistoric times (Farrer, 2006). Because at that time humans had to face harsh nature with the aim of surviving by fighting ferocious animals and hunting which in the end humans developed self-defense moves. Educational research, especially research and development research, is known as validity and reliability which will show whether the product made can be used effectively and efficiently later so that it can be mass produced so that it can be used as it should.

Validity is the level of reliability and validity of the measuring instrument used (Trockel et al., 2018). The instrument is said to be valid, meaning that the measuring instrument used to obtain data is valid. Thus, a valid instrument is an instrument that is truly appropriate for measuring what you want to measure (Clark & Watson, 2019). It can be said validity, namely the extent to which a measuring instrument is precise in measuring a data. In other words what is the measuring tool. A variable or question is said to be valid if the score of the variable or question is significantly

correlated with the total score (Reynolds et al., 2021). Reliability is a measure indicating that the measuring instrument used in behavioral research has reliability as a measuring tool (Hedge et al., 2018), which is measured through the consistency of measurement results from time to time if the phenomenon being measured does not change, while validity is a measure indicating that the variable being measured is true the variable that the researcher wants to examine. It can be said that reliability is a measure that shows the extent to which measurement results remain consistent when measured when measured several times with the same measuring instrument (Parsons et al., 2019).

B. Methods

The research design used in this research is research and development. According to Sugiyono (2017), development research methods are research methods used to produce certain products, and examine the effectiveness of these products. On the other hand, to produce certain products, needs analysis is needed and to test the effectiveness of these products. Research and development methods are widely used in the fields of Natural Sciences and Engineering (Kurniawan et al., 2019). However, research and development is also commonly used in the social sciences, management, and education. In the field of education, this research is the development of one of which produces a product. In this research and development it is focused on producing test instrument products for the Contribution of Punches and Kicks for pencak silat athletes. Where this research can be used to select and at the same time evaluate the athlete's technical training.

C. Results and Discussion

Product Validation

Product validation is an activity process to assess whether the product design, in this case the new work system will rationally be more effective than the old one or not (Sugiyono 2017). In order for this development research to be valid, the researcher added a questionnaire in which media experts, test and measurement experts and linguists and pencak silat material experts filled out according to the questions provided or in other words used content validity. Because according to Azwar (2010) content validity is validity based on expert opinion that the instrument is feasible to be used as a data collection tool. Evidence of content validity is obtained by making an agreement from experts (expert judgment), namely material experts and media experts. So that the products from the research will be validated by experienced experts or experts to assess the new products that have been designed, in order to find out the advantages and disadvantages.

1) Media Expert
   Media experts will assess aspects, namely: aspects of the suitability of the program to measure the speed and strength of the Collaborative Punch and Kick of Jambi City pencak silat athletes, the design of the test instrument for the Jambi City Collaborative Punch and Kick pencak silat athletes. Assessment is expected to determine the quality of the tool.
2) Test and Measurement Expert
   In this study, test and measurement experts are lecturers/experts who usually handle tests and measurements related to types such as making test instruments or such as punch and kick collaborative test instruments for pencak silat athletes in Jambi City. Validation is carried out whether this test kit is suitable to be used as a test instrument and measurement of the speed and strength of Collaborative Punches and Kicks for pencak silat athletes.
3) Material Expert in Martial Arts
   Material experts will assess the material presented and the suitability of the program in terms of measuring the speed and strength of the Collaboration of Punches and Kicks of the Jambi City pencak silat athletes. The assessment is expected to determine the quality and effectiveness of the technology-based Collaborative Punch and Kick test instrument for Jambi City martial arts athletes.
4) Trial Subjects
   The test subjects in this development research were pencak silat athletes in Jambi City. The trial was carried out through several stages. There are 2 stages of trials, (1) one-on-one trials with 1 athlete, (2) medium-scale trials with 10 athletes. The technique for determining test subjects in this development research was by purposive sampling method.

Construct Validation

Instrument standardization

Description of Standardization Process

The tested stands in front of a technology-based test instrument and the foot that will kick must pass through the Ping sensor which is placed on the side of the foot as a speed meter and the hand that will make the stroke movement must pass through the Ping sensor as well which will not be on the side of the hand that will hit if already using the front left stance and hands in the pairing position, while looking for a position then the tested performs kicks and punches directed at the center of the target or the punching bag/Human Doll in which there is a Square sensor as a technology-based punch and kick counter. processed and developed.

The tested is given the opportunity to collaborate four times with punches and kicks.

Standard Test Criteria

Validity test This test is a feasibility test of the instrument which was developed through the assessment of experts. Reliability testing is carried out in two ways, namely by calibrating test instruments in laboratories and authorized agencies as well as test and retest techniques for testing the use of tools in the field.

Trial Sample

In this study, the samples used as trials were pencak silat athletes from Jambi City.

Trial

According to Salomon (2012) suggests that media are various types of components that can stimulate someone to learn. Therefore, every test of speed and strength of the Pencak Silat Collaborative Punch and Kick that is carried out requires media or technology-based test instruments so that the validity and reliability of the test can be calculated.

Reliability

Reliability is the consistency of the combined items for the dichotomous score which can be calculated using the formula. Which is an assessment using percentage figures intended to determine the status of something that is percentage and presented in the form of a percentage (%).

The feasibility calculation formula according to Sugiyono (2017) is as follows:
$formula$: $\frac{SH}{SK}$ information:

SH : count score
SK : Criterion score

The results of data calculations are then made in the form of a percentage multiplied by 100%. After obtaining the percentage with this formula, the feasibility of the collaboration test instrument for the Punch and Kick of the Jambi City pencak silat athletes in this development research was classified into four feasibility categories using the following scale.

Table 1. Percentage Category according to Arikunto (1993)

Percentage Score	Score Criteria
< 40 %	Not Good
40 % - 55 %	Less
56 % - 75 %	Fair
76 % - 100 %	Good

The questionnaire used in this research is an assessment or response questionnaire in the form of answers and assessment information, namely. (1) Strongly disagree/very inappropriate, (2) Inappropriate/inappropriate, (3) Appropriate/decent, (4) Very appropriate/very feasible.

Expert Review Results

Media Expert Validation

The media expert who became the validator in this development research was Dr. H. Sukardi, M.T., IPM. He is a lecturer at the Faculty of Engineering, Padang State University. The researcher chose him as a media expert because of his competence in electricity and programming. Data collection from media experts was obtained by showing the punch and kick collaboration test instruments for pencak silat and videos of athletes doing straight kicks to the sansak where the product is "Development of the Punch and Kick Collaborative Test Instrument for pencak silat athletes in Jambi City" along with an assessment sheet in the form of a questionnaire or questionnaire.

In this validation, the percentage obtained from the feasibility of the program's speed and strength of Pencak Silat Punches and Kicks was 100.00%, from the design feasibility of the Pencak Silat Collaborative Punch and Kick test instrument design was 89.28%, and from the total score obtained 91.66%. Therefore, from the feasibility aspect of the program, the speed and strength of the Pencak Silat Collaboration Punch and Kick and the feasibility of the design of the Pencak Silat Collaboration Punch and Kick test instrument, it was categorized as "feasible".

Expert validation of tests and measurements

The test and measurement expert who became the validator in this development research was Dr. Arsil, M.Pd. He is a lecturer in sports education, Faculty of sports science, Padang State University. Researchers chose him as a test and measurement expert because of his competence in the field of tests and measurements. Data retrieval from test and measurement experts was obtained by showing the pencak

silat straight kick test instrument and the video of the athlete doing a straight kick to the sansak which product is "Development of the Punch and Kick Collaborative Test Instrument for pencak silat athletes in Jambi City" along with an assessment sheet in the form of a questionnaire or questionnaire. In this validation, the percentage obtained from the material presented was 100.00%, from the feasibility of the tool design it was 100.00%, and from the total score it was obtained 100.00%. Therefore, from the aspect of the material presented and the feasibility of the design of the tool, it gets the "feasible" category.

Validation of Pencak Silat Material Experts

The material expert on pencak silat who became the validator in this development research was Muhammad Amin.M.Pd. He is a trainer for IPSI Pencak Silat athletes throughout Jambi Province. The researcher chose him as an expert in pencak slat materials because of his competence in the field of pencak silat. Data collection from test and measurement experts is obtained by showing the Collaborative Pencak Silat Punch and Kick test instruments and videos of athletes carrying out Collaborative Punches and Kicks in the form of Pencak Silat Humans and Pencak Silat Athletes wearing Bracelets on the feet and hands which have sensors on the bracelets PING, which product is "Development of a Collaborative Test Instrument for Punches and Kicks for pencak silat athletes in Jambi City" along with an assessment sheet in the form of a questionnaire.

In this validation, the percentage obtained from the suitability of the program for elements as a pencak silat test instrument was 100.00%, from the feasibility of the Pencak Silat athlete Collaboration test instrument was 100.00%, and from the total score obtained 100.00%. Therefore, from the aspect of the suitability of the program for elements as a pencak silat test instrument and the feasibility of the Punch and Kick Collaborative test instrument, pencak silat athletes get the "decent" category.

Test One on One

The one-on-one test was carried out on one pencak silat athlete from Jambi City. The purpose of the one-on-one trial was to determine the product quality of the speed and strength test instrument of the Pencak Silat Punch and Kick Collaboration. One-on-one trials were carried out at the IPSI Padepokan, JAMBI CITY. This trial was observed by the Pencak Silat trainer. Before the trial was carried out, the researcher first explained the working mechanism of the pencak silat Collaboration Punch and Kick test instrument. After explaining the working mechanism of the Pencak Silat Collaboration Punch and Kick test instrument, a pilot test was carried out.

After the athletes tried using the pencak silat Collaboration Punch and Kick test instrument, the researcher asked the coach to provide feedback and an assessment of the pencak silat Collaboration Punch and Kick test instrument which measured the speed and strength of the collaboration punches and kicks made. The results of the responses and assessments of the tool stated that the tool was feasible to use. From the table of one-on-one trials conducted by 1 athlete and observed by the trainer above, it can be seen that the percentage obtained from the eligibility of the content of pencak silat material is 87.5%, from the design of the punch and kick collaboration test instrument for Jambi City pencak silat athletes is 77, 77%, and from the total score obtained 79.54%. Therefore, it gets the "decent" category.

Mid-Scale Trials

The mid-scale trial was carried out by 10 respondents from Jambi City martial arts athletes who were Jambi City martial arts athletes using the Collaborative Punch and Kick technique of 4 punches and kicks. The trial was carried out in one meeting. Conditions during the medium-scale trials as a whole can be described as follows. (a) Conditions for explaining the operation of the Punch and Kick Collaboration test instrument which produces kick speed and power, respondents or athletes looked enthusiastic, curious and asked questions to the coaches and researchers when given an initial explanation about the tools being tested and when athletes tested their collaboration punch and kick to find out how fast and powerful that collaboration they have; (b) Conditions for using the Pencak Silat Collaboration Punch and Kick test instrument which can measure the speed and power of punches and kicks, the respondent or coach looked enthusiastic.

It seems that some respondents asked about the specifications and uses of the test instruments which according to them still felt foreign because they could also measure strength, apart from speed; (c) Conditions when respondents or athletes used the Punch and Kick Collaboration test instrument which was carried out by each athlete totaling 10 people, the trainer paid attention to the explanation regarding the procedure for filling out the questionnaire, the coach filled it in carefully. With full concentration, even though there were a few errors in filling out, over all the filling out of the questionnaire went smoothly.

From the table of medium-scale trials conducted by 10 athletes and observed by the coaches above, it can be seen that the percentage obtained from the feasibility of the content of pencak silat material was 91.66%, from the design of the punch and kick collaboration test instrument for Jambi City pencak silat athletes at 97.5 %, and from the total score obtained 96.15%. Therefore, it gets the "decent" category. According to the data that has been obtained in this study, the data analysis of the results of this study resulted in the following results. (a) Based on validation from media experts, test and measurement experts, and material experts on pencak silat, the test

instrument for the Jambi City pencak silat athlete's Collaborative Punch and Kick was declared in the "feasible" category to be tested. So it was decided to proceed to the next stage of research. (b) After that, a one-on-one trial was carried out with 1 respondent or an athlete in the pencak silat sport and was observed by the coach, then the Jambi City pencak silat athlete trial was continued with a Punch and Kick Collaboration which also had no deficiencies, so that it could proceed to the trial try the medium scale against 10 athletes of Jambi City martial arts. (c) Based on the one-on-one trial, the medium-scale trial showed the test results of the Collaborative Punch and Kick test instrument for Jambi City pencak silat athletes in the "Decent" category. The results of the data obtained are interpreted according to predetermined categories. The categories used in this development research were divided into several sections, namely for a value of <40% it was categorized as unfit, 41-55% was categorized as inadequate, 56 - 75% was categorized as sufficiently feasible, and 76 -100% was categorized as feasible.

Produced Product Discussion

At the beginning of the development of the Punch and Kick Collaboration test instrument for Jambi City martial arts athletes, it was designed and will be mass produced into an initial product in the form of a Punch and Kick Collaboration test instrument that can measure the speed and power of punches and kicks for Jambi City pencak silat athletes for all ages and gender in the process going forward. The development process through research and development procedures. Through multiple planning, production and evaluation. Then this product was developed with the help of someone who mastered electronics and mechatronics engineering. This development goes through various stages, namely the design stage, the sanction stage, Hardware I, Hardware II, Hardware III, Software I. After the initial product is produced, it needs to be evaluated to experts through expert validation and needs to be tested on athletes. At the evaluation stage it was carried out on media experts, test and measurement experts and martial arts material experts. Furthermore, the research phase was carried out with one-on-one product trials, medium-scale trials.

In the process of validating media experts, test and measurement experts and material experts on pencak silat, it is carried out using content validity which according to Azwar (2010) content validity, namely validity based on expert opinion that the instrument is feasible to be used as a data collection tool. Evidence of content validity is obtained by making an agreement from experts (expert judgment), namely material experts and media experts. Based on the results obtained, it can be continued to the next stage because the tool is declared feasible and there is no revision to the Punch and Kick Collaboration test instrument for the Jambi City pencak silat athletes. After completing the validation by experts, it will

proceed to the trial stage. The trial was carried out in two stages, namely the one-on-one trial stage, and the medium-scale trial. The quality of the "Development of the Jambi City Pencak Silat Athlete's Collaboration Test Instrument" is included in the "Decent" category.

This statement can be proven from the results of the analysis of the "Easy" assessment of the three experts, both media experts, test and measurement experts, as well as material experts for pencak silat. Silat as well as in one-on-one trial assessments, and mid-scale trials. Respondents or athletes feel enthusiastic and want try the test instrument, because the respondents are interested in trying it and wondering about how it works and how much speed and strength the Collaborative Punch and Kick have practiced so far, this product can be disseminated as a test instrument for the Pencak Silat Collaborative Punch and Kick can measure speed and strength.

There are advantages and disadvantages of this tool. The advantages include (1) Providing efficiency and effectiveness to coaches as a Punch and Kick Collaboration test tool that can measure the speed and strength of each athlete. (2) Can help athletes hone their Collaborative Punch and Kick skills. (3) The height of the sansak and the size of the PING sensor bracelet are adjusted as needed. (4) Increase knowledge about technological advances. Disadvantages include (1) Unable to catch a kick if it is not right on the sensor. (2) Using a PING sensor bracelet, you can't take too long and you can't make movements without hitting the doll's bag, because you can calculate speed without stopping time. Therefore, it is necessary to have the signals "ready" and "yes". (3) Need to be reset or pressed the reset button when the sensor is too sensitive. (4) the sansak stands upright, which is the form of the sansak doll which can collapse at any time if the retaining part of the leg is rusty, so it still requires someone to hold it too.

D. Conclusion

The results of the study "Development of the Punch and Kick Collaborative Test Instrument for pencak silat athletes in Jambi City" were categorized as suitable as a Collaborative Punch and Kick test instrument that could measure the speed and strength of each punch and kick of the Jambi City pencak silat athletes. This can be seen from the results of the assessment of media experts, namely 91.66%, test and measurement experts 100.00%, and material experts in pencak silat 100.00% and based on the results of medium-scale trials, namely 96.15%.

The way the Jambi City pencak silat athlete Collaboration test instrument works is to connect the power supply to the electricity, turn on the power supply and sensors on the bag and bracelet that have a PING sensor, use the Sensore PING bracelet, then do

a Collaborative Punch and Kick about the middle the punching bag, then when swinging the legs and arms with the movement of punches and kicks and continuing to hit the punching bag will transmit information to the instrument box about the speed and strength of the athlete's punches and kicks. Then the software will record the speed and strength of each punch and kick

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