

Developing a Performance Assessment of Kicks in The Competition Category of *Pencak Silat* Martial Arts

Awan Hariono^{1✉}, Tandiyo Rahayu², Sugiharto²

¹ Universitas Negeri Yogyakarta, Indonesia

² Postgraduate Universitas Negeri Semarang, Indonesia

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Abstract

The standard assessment of the competition category of *Pencak Silat* martial arts is not available in the Special Region of Yogyakarta (DIY). The objective of this research is to develop a performance assessment of the competition category of *Pencak Silat* martial arts in DIY based on a review of sports biomechanics. The method used in this study was research and development. The subjects were 6 fighters for the initial trial, 14 fighters for the small scale trial, and 53 fighters for the large scale trial. The content validity measure was employed to determine the validity of the data, while the product moment correlation was implemented to measure its reliability. The level of objectivity was analyzed with the interrater technique (Alpha coefficients). The results of the study are as the followings. 1) The performance assessment of the kicks in the competition category of *Pencak Silat* martial arts in the province of DIY is highly valid; 2) The performance assessment of the kicks in the competition category of *Pencak Silat* martial arts in DIY is highly reliable; 3) The performance assessment of the of the kicks in the competition category of *Pencak Silat* martial arts in DIY is highly objective; 4) The performance assessment of the of the kicks in the competition category of *Pencak Silat* martial arts in DIY is divided into five categories, namely: very good, good, average, poor, and very poor. The conclusion of this study is that the performance assessment of kicks in the competition category of *Pencak Silat* martial arts in DIY is classified into five categories. It is suggested that the generalization area may be broadened and it is necessary to involve more subjects in the large-scale trial.

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✉Correspondence:

Jl. Colombo No.1, Caturtunggal, Kec. Depok, Kota Yogyakarta,
Daerah Istimewa Yogyakarta 55281, Indonesia

E-mail: awan.dibha@gmail.com

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INTRODUCTION

The basic principle of the competition category of Pencak Silat martial arts is scoring by doing offense and defense. A score in the competition category of Pencak Silat martial arts is obtained when an offense hits the target and is not blocked by the opposing defense. In order to be able to offend and defend, it is necessary to master the skill of applying the basic techniques of the martial arts that are urgently needed. The basic techniques in the martial arts include (1) horse stance; (2) pair position; (3) step pattern; (4) defense (block and evasion); (5) offense (punch, elbow block, and kick); (6) slam/drop (Hariyadi, 2003: 16).

For novice fighters, these techniques may not be taught simultaneously but taught a sequence based on the priority scale of the use of each technique. Because kick is the dominant technique used during a competition, the technique is of particular concern during the training process. Based on his study, Agung Nugroho (2005) indicates that the kick is the dominant technique used in a competition that is 47% (Nugroho, 2005: 15).

A kick technique is an effort or process which is done by using both legs to defend and offend in order to gain as many scores as possible during the game. A kick can also be interpreted as an attack carried out by using the legs and feet as the components of the attacker. In the competition category of Pencak Silat martial arts, kicks are often used as the main weapon for offense and defense to gain scores. The score obtained through the kick technique is 2 or 1 + 2. A score of 2 is obtained when a fighter can kick and hit a specific target using power. Meanwhile, the value of 1 + 2 is obtained when a fighter can evade, avoid, or block an attack and then strike back using a kicking technique and hit the desired target with power (Persilat, 2012: 20). In addition, a kick can also score 3 when the fighter is able to offend resulting in the opponent to fall within the competition arena.

In the competition category of the Pencak Silat martial arts, a fighter with a good kick

technique will gain many benefits during the game. Although the kick technique is as important as the striking technique, the former is more powerful than the latter. In addition, the legs have a longer range than the arms so that it will be more beneficial when used to attack. Given the magnitude of the benefit during a competition, the kick technique is very important to teach to the Pencak Silat fighters of the competition category. Therefore, in order for the kick techniques to be mastered effectively and efficiently, both the trainer and the fighter must understand each characteristic of the kick techniques being taught and learned.

(Lubis, 2004: 26) classifies the kick techniques into several types, including straight kick, stab kick, kepret kick, jejag kick, rascal kick, T kick, celorong kick, back kick, horse kick, spurs kick, sickle kick, baling kick, down kick, and gejig kick. Meanwhile, Nugroho (2001: 17) categorizes kicks into four types based on how the kick hits the target, namely: (1) front kick, i.e. a kick with the back, palms, fingertips, and heel of the foot; (2) sidekick (T), i.e. a kick with the hand, foot, and heel; (3) back kick, i.e. a kick with sole and heel of the foot; (4) arc (sickle) kick, i.e. a kick with the back, the rear end of the foot, and the heel of the foot arc.

The competition category of the Pencak Silat martial arts is a body contact sport that requires good bio-motor ability. A fighter who has the good bio-motor ability will find it easier to move effectively and efficiently. Every movement that is carried out effectively and efficiently is able to provide optimal results in the game. For that reason, the right way of performing such basic techniques is a determinant of the fighters' success in each and every game. According to Sukadiyanto & Dangsina (2011: 9), the right technique introduced at the beginning of a game will not only save energy so as to move longer and work well but is also the basic foundation towards higher achievement. Therefore, in order to learn the techniques, particularly kick techniques, it should be emphasized on correct technique of

motion resulting in the mastery of proper techniques of motion.

During the match, the effectiveness and efficiency of the techniques can be seen from the hit of a kick towards the target (impact) and the effect resulted from the hit. A kick technique that provides a score in the game is a kick technique that hits a target area with power (making a loud sound) unhindered by any defense and it changes the opponent's position. In addition to a good bio-motor capacity, it also needs an ability to perform good and right motion techniques.

The implementation process of studying the kick techniques need to be considered carefully. The coach takes an important role in introducing the correct technical motion to the learners. In order to obtain effective and efficient results, they must be guided and their performance evaluated for the errors they committed and they need information about ways of doing the right motion. Thus the learners are always controllable and have an idea of the kick technique to be performed. In fact, rarely does a coach correct techniques during the training process. The coach merely presents the materials through demonstration or examples, so that many learners do not master the technique properly. As a result, although many learners are trained from early ages, their motion technique is not perfect because the trainer is obsessed with a competition that the trainees have to join a match even though their mastery of the technique is not perfect. Viewed from such condition, there are a lot of fighters who implement such technical motion ineffectively and inefficiently, during the match thus impeding their achievement.

The kick techniques must be implemented in several motion stages, namely, starting from the initial position, implementation (take off, forward, and impact), as well as a final position (backward and ready stance). Considering the complexity of the motions during the implementation of the kick techniques, it is necessary to employ a standard implementation in order to simplify training and accelerate the trainees in mastering the techniques. Therefore,

the process of mastering the kick techniques not only relies on quick observation but also needs the support of science and technology. Given that the motions in the martial arts need kick techniques performed with a particular rhythm of explosive motion, it seems that there is not any clear mistake while implementing the kick techniques.

From the observation results, the mistakes that often occur during the implementation of the kick technique in martial arts are those of togok, hips, knees, and feet fulcrum positions. This happens because the coach does not have clear standards for the implementation of the kick techniques from the initial position until the final one. The assessment of the results of the kick technique implementation is based only on the effectiveness of the motion performed during matches but ignores the efficiency values of the motion.

Up to this moment, the assessment of the level of the fighters' mobility in the kick techniques is based only on the coach's observation during the training process. As a result, the element of subjectivity in the assessment is still dominant. Therefore, it is necessary to formulate a measuring tool that can be used to evaluate the fighters' ability to implement the kick techniques. Subsequently, the achievement of every exercise program can be assessed for the benefits of the future coaching.

Assessment is an important aspect of the process of learning and training. Through such assessment, the teachers and coaches are well informed regarding the progress of the athletes' learning and training, so that its successes or failure in learning and practicing the martial arts is identifiable. In order to administer proper assessment it is necessary to test, measure, and evaluate properly. The quality measurement of kick techniques in martial arts needs a valid and reliable test. However, such a test is unavailable in Indonesia.

The observation results show that there is no tool or measuring instrument that can be used to measure the motor skills of kick technique in martial arts. The assessment for the

success of any kick performed by the fighters is still dependent on the results of coach's observations. As a result, the standard to assess the implementation of the kick technique is still subjective. Therefore, it needs an instrument that can be used as a yardstick to judge the success of kick technique learning in martial arts, especially that of competition category. An instrument is a measuring tool used to obtain both quantitative and qualitative information regarding the variations of the characteristics of the objective assessment variables.

Based on the above realities, the performance assessment of kicks in the martial arts, especially that of competition category needs to be designed through research. The preparation of such assessment in martial arts is important to know the proficiency level of the kicks that have been taught to the fighters. Therefore, the assessment of the level of motor skills in martial arts kick technique can really be administered objectively. In addition, the performance assessment of kicks in the martial arts is can be used as input and reference for the martial arts coaches to be more creative in choosing a test and developing the kick technique motion in martial arts.

In the competition category of martial arts, the success of the kick is determined by the fighter's ability to perform a series of movements simultaneously. The coaches and fighters must have the ability to identify and analyze every stage of the kick techniques implementation; the coaches and fighters must have good knowledge of biomechanics. Given that the athletes who understand the laws of mechanics find it easier to learn and master the skills being trained, it is possible for the fighters to move faster and better in line with the quantity and quality of the exercise (Bartlett, 2007: 2). Related to benefits for the coach, More in Hughes & Franks (2008: 264) states that "A primary function of every coach is to provide athletes with the opportunity to acquire, refine and learn skills that will produce a successful performance in competition".

In sports activities, biomechanics knowledge has enormous benefits for the coach

to resolve the issues that are directly related to the objective conditions in the field. Through knowledge of biomechanics, the trainer can examine and put the motion as a key element in the sports. In addition, by understanding biomechanics it expected to further facilitate coaches in an effort to (1) analyze the techniques properly and carefully, (2) develop new techniques, (3) select appropriate equipment, and (4) improve appearance (Payton, 2008: 1-2).

One of the advantages of the coaches who understand the science of biomechanics is that they are more confident in providing exercises because they know the efficiency of every motion of the techniques being taught. Therefore, in teaching motion skills of the techniques, the coaches are not only based on their experience acquired as athletes but they may choose a more precise method based on scientific reasons why the motion should be practiced. This is in accordance with the opinion of McGinnis (2005: 7) who states that "an analysis of technique deficiencies of an athlete can assist the coach or teacher in identifying the type of training the athlete requires to improve".

The range of the motion of the kick techniques includes the initial position, implementation, and a final position. The initial position in martial arts is often referred to as tidal position. The initial position is the basic position to implement every motion technique in martial arts. (Nugroho, 2001: 38) defines pair position as a standby position to defend or attack in patterns and to be performed at the beginning and end of the motion range. Moreover, the tidal position can also be interpreted as a tactical position to face an opponent in attack or defense pattern (Lubis, 2004: 10). In martial arts, there are various kinds of pair position which are often used both in training and matches. In order to have similar perception of the pair position, PB IPSI standardizes the motion of pair position into: (1) the position of pair one; (2) the position of pair two; (3) the the position of pair three; (4) the position of pair four; (5) the position of pair five; (6)) the position of pair six; (7)) the position of pair seven and (8) the position of pair eight. Based on a review of

sports biomechanics, the eight pairs of position have different functions for each motion of the kick techniques performed by the fighters. For example, the most efficient pair position to do a front kick is the position of pair one. Therefore, the pair position one has a shorter trajectory distance and the position of the foot is in a straight line; it will be more efficient when applied to implement the front kick technique.

Viewed from the motion process, the implementation phase of the kick techniques can be divided into three series of motion, namely: by the time of take-off, forward, and hit the target (impact). The success of kicks in the competition category of martial arts is determined at the implementation stage. Therefore, the implementation phase should be done properly for the efficiency of the motion. Bompa & Haff (2009: 62) state that the correct technique has a very high level of efficiency (good techniques = high efficiency). The factors that affect the efficiency of the motion during the implementation phase include (1) the predominant performance of leg muscle, (2) the trajectory kick, (3) the movement of the hip, (4) the position of togok and the head, (5) the position of the arm, and (6) impact (hit of the feet on the target).

The final position of the motion of the kick techniques is divided into two sets of motion, that is the backward and ready stance. In the motion of kick techniques, there is no follow through motion due to a concentric and eccentric muscle contraction. In addition, the motion of kicks in the training process is cyclic so that there are often frequent repetitions of the same movement. In a final motion of the kick technique, the analysis is preferably focused on the positioning of the foot pivot and the point of the body weight. The point of the body weight is affecting the balance of the fighters after a shot, because of the external influences that may cause the point of the fighter's body weight positioned beyond the body. If the fighter can not maintain the level of balance after a shot, it will cause the fighter to face difficulty in doing the next motion.

Considering the motion of the kick techniques from the initial position up to the final position, it can be seen that every phase of motion is influenced by the internal and external style acting on the body of the fighter. The principles of mechanics greatly affect the performance of the fighters at the time of the kick technique motion. The mechanics' principles that can affect the performance of the kicks techniques in the martial arts include acceleration, balance, leverage, force, and impulse-momentum.

1. Acceleration

The application of acceleration when kicking is determined by 1) the initial acceleration shortly after take-off, 2) the force used for kicking, 3) the time during which the force is generated, and 4) the length of the leg. Acceleration is the change of velocity per one unit of a certain time. Acceleration in the kick technique occurs when the foot fulcrum starts to take-off until the moment before the impact. Acceleration is supposed to obtain additional force so as to increase the magnitude of the momentum during impact on the target.

2. Center of Mass and Balancing

At the time of the kick, the location of the gravity center of the body will change at each stage of implementation in line with the position and will affect the motion of the technique performed. The lower the location of the center of the body mass, the more balanced and stable the body is although it requires a larger force to initiate the motion. In the competition category of the martial arts, one indicator of success is when the incoming kick hit the target and the opponent finds it difficult to defend, evade, or catch. It shows that the kick requires a good speed capability from the fighter. Besides, the implementation the kick technique requires a series of movements that must be carried out simultaneously, from the stepping up the motion to cracking the foot on the target back to the initial position. Therefore, the level of necessary balance required by the fighter at the time of implementing the kick technique is the unstable equilibrium.

The step and swing motion of the leg during the kick technique implementation very much determines the outcome of the kick techniques. The sooner the step is taken, the better it facilitates the motion of the fighter in kicking. Therefore, the emphasis on center mass one of the keys to the success of the implementation of the kick. In other words, the amount of flex of the knee will also give effect to the equilibrium level of the fighter at each stage of the kick techniques.

Levers

Levers are used to gaining the mechanical advantage, where a small force applied would be changed to cope with and raise a considerable burden. The longer arm swings, the faster its acceleration is. The application of the levers in kick techniques is when the fighter takes off and impacts on the target. Placement pivot foot and leg swing as the levers has a considerable influence on the results of the kicks performed by the fighter.

Force

A force is a unit that has a direction so it belongs to the magnitude of a vector. Newton's first law states that "If a resultant force acts on a zero object, then the object is stationary (not moving) or will move in a straight line". A resultant force is the sum of forces acting on the object. In the implementation of the kick techniques, a fighter with high and great posture will provide greater force to the target at the time of impact, because the great posture will also produce greater force. Besides, the force is also influenced by the speed. The higher the speed, the greater the force applied at the time of doing the motion.

Impuls-Momentum Law

Momentum is the result of multiplying mass by speed and every change in momentum is proportional or equal to the impulse producing it. The amount of momentum will affect the two colliding objects. In the implementation of the kick techniques, the force is done in the same direction as the motion so that the body mass and speed of motion when performing the

technique will determine the amount of momentum in the implementation of the kick.

METHODS

This research can be classified as research development, which is a process or steps to develop or improve a product. The product mentioned in this study is a form of performance assessment of the kicks in the martial arts that is expected to be used to estimate the truth of motion techniques performed by fighters of the competition category. The development model in this study followed the steps of the model of R & D (Borg & Gall, 1983: 774-787) dividing it into four stages, namely (1) the initial analysis, through research and information gathering; (2) the development of the test, through planning up to testing; (3) the creation of tests manual; (4) dissimulation and implementation.

The trial of the performance assessment model of the kicks in the martial arts was performed three times. The first trial performed on some fighters in order to ensure that the test developed could be administered by the testees. The second trial was carried out on a small scale in order to find the reliability and validity of the test. Meanwhile, the third trial was carried out on a large scale containing several staged groups with the goal of determining the norm. The design of the performance assessment of the kicks in martial arts in the trial includes procedures including the place and the implementation guide.

The subject of the trial in this research was distinguished according to the trial design, i.e. the initial trial, the small-scale trial, and the large-scale trial. The initial trial was attended by six fighters, the small-scale involved 14 fighters who were actually the athletes of the regional training center of DIY, and the large-scale trial employed 53 athletes from districts/municipalities training centers in the province of Yogyakarta. The type of data obtained in this study could be divided into two types, namely quantitative and qualitative data. The qualitative data was obtained through a Focus Group Discussion (FGD) while

quantitative data was obtained through the performance of the fighters at the time of kicking.

The data analysis technique used in this study was quantitative and qualitative descriptive. The qualitative data analysis was resulted from the experts' assessment of the quality of the motion techniques during the trial phases either on the small or large scale. Meanwhile, the quantitative descriptive analysis could be explained as follows. (a) The validity of this research was proved using the content validity that is the opinion of the experts who were competent in martial arts and sports biomechanics science; (b) the level of the test reliability in this study was proved using agreement among the experts who were competent in martial arts using Kappa; (c) the level of objectivity of the study was proved by using interrater analysis (Alpha coefficients).

RESULTS AND DISCUSSION

Results

Trial data is data that is used before the actual data withdrawal. The data obtained from the assessment of the experts associated with the actual data retrieval that is expected to produce a product of the research that is performance assessment of kicks in the competition category of martial arts in DIY. The resulting product is expected to be used as an instrument for (1) assessing the capabilities of implementing the athletes' kick techniques in the competition category of martial arts in DIY; (2) determining the validity, reliability, and objectivity of the performance assessment of the athletes' kicks in the competition category of martial arts in DIY; (3) providing knowledge for trainers and coaches in designing exercise programs which are appropriate to the training process for the athletes of the competition category of martial arts in DIY.

Expert Validation

An expert validation is a process of assessing whether or not the draft of the initial product to be tested is feasible both in a small scale and

large scale. The initial product of the performance assessment of the athletes' kicks in the competition category of martial arts in DIY needs to be validated by the experts prior to the small scale trial. The initial draft was validated by experts associated with this research, i.e. those who work in the field of coaching techniques in martial arts, practitioners of martial arts, and sports biomechanics expert. In addition, the draft of the initial product was consulted to experts accompanied by an evaluation sheet containing the quality content and construction of the instrument as well as suggestions and comments of experts to the draft of the initial product that has been made.

Data analysis

The results of the experts' validation to the initial product of the performance assessment of the athletes' kicks in the competition category of martial arts in DIY was used as a guide to state whether the product is feasible to be tested on the small scale and large scale trials. Based on the calculations using percentages it was shown that 91.80% of experts agreed and 8.20% of them disagreed with it. This indicates that the initially proposed product could be declared eligible to be tested on a small scale trial because the percentage of experts agreeing was greater than the percentage of experts who disagreed with it. Therefore, it can be concluded that the performance assessment draft of the competition category of martial arts in DIY has met the requirement of the content validity identified through the expert judgment so that it fulfilled the requirements to be tested on a small scale.

Moreover, from the expert assessment of the initial draft, there were some input and suggestions for repair before the trial. Among them are (1) the assessment indicators were to be simplified by classifying them into three stages: the initial position, implementation, and final position; (2) the initial position was to be adjusted with the appropriate pair position; (3) the sickle or crescent kick was to include the magnitude of angle rotation of the foot pivot; (4) the impact to the target should take into account differences in institution; (5) in the

implementation of the front and crescent kick there was a change in the use of the term 'snap'; (6) the range of scores was to be made wider.

Based on the advice and input from the experts on the improvement of the initial product, the draft was then revised as a material to be tested in a small group trial. Of all the suggestions and input, some were discussed based on the researchers' argument. After revisions, the experts stated that the draft of the performance assessment of the kicks in the competition category of martial arts in DIY could be directly tested in a small scale trial.

Small-Scale Trial Data

The small scale trial functioned to see to the extent of which the initial product could be used. In order to apply the initial product, the researchers involved athletes of the regional training center in DIY amounting to 14 athletes; the trial was conducted in Hall Beladiri FIK UNY on July 6, 2015. The initial product was tried while recording the motion of the techniques implemented by the subject, namely the technique motion of the front kick, crescent kick, side (T) kick, and back kick. Furthermore, the experts observed it through the video recording to see the quality of the technique motion performed by the subject. The results of the experts' observation were in the form of technical scores with a range of 1 to 5. The results of the experts' assessment of the 14 subjects in the small scale trial are as follows. (1) Judge I's mean score was 3.9; (2) judge II's

mean score was 3.9; (3) judge III's mean score was 4.5. These results indicate that the initial product fulfilled the item criteria because the average scores of the three judges were almost the same. The objectivity test to the three raters' assessment using Cronbach Alpha, resulted in the value of 0.934 at the significance level α : 0.05. Therefore, the test results of the preparation of the performance assessment of the kicks in the competition category of martial arts in DIY can be considered an objective and qualified to be tested on a large scale trial.

Large-Scale Trial Data

The large-scale trial was done after the small-scale trial had been fulfilled. The large-scale trial was applied to 53 fighters of the competition category fighters of the residential/municipal training centers participating in the Provincial Sports Week (Porprov) in DIY. The large-scale trial was conducted in FIK UNY Martial Arts Hall on September 7, 2015.

In the large-scale trial, each subject implemented the front, crescent, and side (T), and back techniques scored by the experts. The scores of the techniques were taken from the average scores given by the experts. The large-scale trial resulted in trial scores from the implementation of the techniques. The data of the test results of the kicks performed on the large scale trial are presented in Tables 1, 2, 3, and 4.

Table 1. Scores of the Front Kick Technique

	Right	Left
N	53	53
$\sum_{\text{Lowest Score}}$	294	282
$\sum_{\text{Highest Score}}$	412	394
Mean	351.94	344.44

Table 2. Scores of Cycle-kick Technique

	Right	Left
N	53	53
$\sum_{\text{Lowest Score}}$	267	264
$\sum_{\text{Highest Score}}$	398	386
Mean	354.63	343.81

Table 3. Scores of Side Kick Technique

	Right	Left
N	53	53
$\sum_{\text{Lowest Score}}$	255	214
$\sum_{\text{Highest Score}}$	378	323
Mean	312.67	270.13

Table 4. Scores of the Back Kick Technique

	Right	Left
N	53	53
$\sum_{\text{Lowest Score}}$	212	234
$\sum_{\text{Highest Score}}$	346	328
Mean	284.40	276.02

To prove whether the performance assessment of the kicks for the fighters of the competition category in DIY is appropriate and feasible, it is necessary to test for normality, validity, reliability, and objectivity. The results of the data analysis can be presented as follows.

Normality test

The normality test aims to determine whether the samples from a population are normally distributed. The evidence of the normality test in this study was obtained from applying the Kolmogorov-Smirnov test. The data analysis resulted in the followings: (1) The front kick provided Asymp Sig of $r_0 = 0.719$; (2) The crescent kick gave Asymp Sig result of $r_0 =$

0.768 ; (3) the sidekick (T) obtained Asymp Sig by $r_0 = 0.814$; (4) the back kick gave Asymp Sig of $r_0 = 0.794$. The results of the above analysis show that the overall data were normally distributed. Therefore, the performance assessment of the fighters' kicks of the competition category in DIY was eligible for analysis.

Validity Test

The validity of the instrument was through a factor analysis by means of correlating the total item scores of the observations with the total score. The results of the inter-rater correlation coefficient calculation can be seen in Table 5.

Table 5. Levels of Test Validity of the Pencak Silat Kicks in Martial Arts of the Competition Category in DIY.

No.	Kick Type	Coef. Corelation	r Crit	Notes
1.	Front	0.968	0.30	Valid
2.	Sicle	0.860	0.30	Valid
3.	Side (T)	0,893	0.30	Valid
4.	Back	0,817	0.30	Valid

Based on the average correlation, it can be inferred that the tests have a high level of validity. Therefore, the performance assessment of the athletes' kicks on the competition category of martial arts in DIY is qualified to measure the

quality of the fighters' kick techniques of the competition category in DIY.

Reliability Test

The reliability of this research data was measured by test-retest. The statistical analysis

used the Product Moment Correlation. The reliability of the test was measured by correlating the performance the first test of the kick performance to the test scores of the second one. The analysis resulted in $r = 0.911$ for the front kick; $r = 0.740$ for the crescent kick; $r = 0.858$ for side (T) kick; $r = 0.814$ for the back kick. Therefore, the four tests can be considered reliable making it eligible to measure the quality of fighters' kick techniques of the competition category DIY.

Objectivity Test

The objectivity test was performed employing three experts, consisting of a practitioner in the field, an expert in coaching, and an expert in the field of sports biomechanics. The results of the experts' scores were then analyzed using the technique of Intraclass Correlation Coefficients (ICC) on SPSS. The results of the calculation of the level of objectivity of the tests are presented in Table 6.

Table 6. Results of Objectivity test of the front kick

No	Indicator	Correlation Coef.	Critical r	Notes.
1	Initial position	0.709	0.266	Objective
2	By the time of <i>Take Off</i>	0.739	0.266	Objective
3	<i>Foreward</i>	0.780	0.266	Objective
4	<i>Impact</i>	0.854	0.266	Objective
5	Final position	0.604	0.266	Objective
6	Initial position	0.704	0.266	Objective

The results of the calculation presented in the above table show that all phases of the front kick are highly objective.

Table 7. Results of Objectivity test of side kick

No	Indicator	Correlation Coef.	Critical r	Notes.
1	Initial position	0.709	0.266	Objective
2	By the time of <i>Take Off</i>	0.597	0.266	Objective
3	<i>Foreward</i>	0.621	0.266	Objective
4	<i>Impact</i>	0.736	0.266	Objective
5	Final position	0.542	0.266	Objective
6	Initial position	0.716	0.266	Objective

The results of the calculation presented in the above table show that all phases of the side kick are highly objective.

Table 8. Results of Objectivity test of side kick (T)

No	Indicator	Correlation Coef.	Critical r	Notes.
1	Initial position	0.704	0.266	Objective
2	By the time of <i>Take Off</i>	0.555	0.266	Objective
3	<i>Foreward</i>	0.689	0.266	Objective
4	<i>Impact</i>	0.612	0.266	Objective
5	Final position	0.642	0.266	Objective

The results of the calculation presenten in kick (T) are highly objective. the above table show that all phases of the side

Table 9. Results of Objectivity test of back kick

No	Indicator	Correlation Coef.	Critical r	Notes.
1	Initial position	0.712	0.266	Objective
2	By the time of <i>Take Off</i>	0.578	0.266	Objective
3	<i>Foreward</i>	0.649	0.266	Objective
4	<i>Impact</i>	0.692	0.266	Objective
5	Final position	0.705	0.266	Objective

The results of the calculation presented above show that all phases of the back kick are higly objective.

Final Product

The revised product of the performance assessment of the competition category kicks in martial arts in Yogyakarta was carried out through several stages. After going through the stages of the revision before the product was tried in a large scale trial it was shown that the construction of the model has not changed and it has a high degree of validity, reliability, and

objectivity. Furthermore, the results of the large-scale trial resulted in the performance assessment criteria of the competition category of kicks in martial arts in the Special Region of Yogyakarta. The athletes' kick performance of the competition category of kicks in martial arts in DIY is categorized into five criteria: excellent, good, average, and poor, and very poor. Based on the categorization of Sudijono (2006), the performance assessment of the competition category of kick techniques in martial arts in the Special Region of Yogyakarta is as follows.

Table 10. Assessment Criteria of Front Kick Technique

Criteria	Right	Left
Very good	≥ 407	≥ 398
Good	371-406	363-397
Average	334-370	327-362
Poor	297-333	292-326
Very poor	≤ 296	≤ 291

Table 11. Assessment Criteria of Crescent Kick Technique

Criteria	Right	Left
Very good	≥ 403	≥ 395
Good	371-402	361-394
Everage	339-370	327-360
Poor	307-338	294-326
Very poor	≤ 306	≤ 293

Tabel 12. Assessment Criteria of Side Kick Technique (T)

Criteria	Right	Left
Very good	≥ 356	≥ 311
Good	327-355	284-310
Everage	299-326	257-283
Poor	270-298	230-256
Very poor	≤ 269	≤ 229

Table 13. Assessment Criteria of Back Kick Technique

Criteria	Right	Left
Very good	≥ 326	≥ 312
Good	299-325	288-311
Everage	271-298	265-287
Poor	244-270	241-264
Very poor	≤ 243	≤ 240

Discussion

The preparation of the performance assessment of the trainees' competition category of kicks in Pencak Silat martial arts in DIY has been developed and validated by experts in the related field, experts in martial arts coaching, and experts in the field of sports biomechanics. Preparation of the performance assessment has also gone through several stages of research and development. In the beginning, the initial product was made on the basis of needs analysis was further developed and evaluated through the various stages of validation and trial activities. Moreover, at the research stage, a series of trials of the products consisting of a small group trial and then large group trial has been carried out.

The results of the validation from the technical expert and the coaching expert in martial arts are used to revise the early stage of the training, then the result of this revision is used to conduct the trial in a small group. Data from the result of the small group trial is an input to revise the product. Product revision is used as a preparatory stage for the preparation of the development of the performance assessment of the competition category of kicks in Pencak Silat martial arts in DIY that is tried in large groups. Therefore, the product of the performance assessment the competition category of kicks in Pencak Silat martial arts DIY has gone through various stages of revision

in accordance with suggestions from various parties.

The performance assessment of the competition category of kicks in Pencak Silat martial arts in DIY is significant to be used to assess the trainees' capability of applying the kick techniques in martial arts. This is proved by the results of the validity, reliability and objectivity analysis that are relatively high. Therefore, the results of the study confirm the initial findings of the research observing several martial arts coaches in Yogyakarta. So far, there has been no standard that applied to assess the fighters' ability to implement the competition category of kick techniques. In general, the coach merely assesses them on the basis of observation so that it is highly subjective.

The results of the performance assessment of the competition category of kicks in martial arts also have advantages; among them is that the fighters are able to participate actively in the assessment process so that they do not feel bored and tired. Consequently, the fighters are interested in and excited to learn the kick techniques. The results of the observation during the implementation of the technique in a large group trial show that the fighters were delighted and excited at the time of the test.

The conducted research also has an impact on improving the ability of the coach to analyze the motion of each individual, every

individual has different characteristics so that the coach can appropriately provide treatment as required. The coach should provide appropriate inputs to the fighters through the selection of training methods, materials, and procedures carefully. Besides, the coach should also help the fighters understand the purpose of the motion that will be trained. When giving input, the coach needs to distinguish between information that is related and not to the skills that will be trained. It is in line with the opinion of Hagger and Chatzisarantis (2005, p.15) who suggest not to give too much information that is not essential to the students in learning new skills.

CONCLUSIONS

The research results showed that: (1) Performance assessment of the competition category of kicks in Pencak Silat martial arts has been developed. It consists of front kick, crescent kick, side kick, and back kick. (2) The validity of the front kick is 0.968; crescent kick 0.860; side kick (T) 0.893; back kick 0.817. (3) The reliability level of the front kick is = 0.911; crescent kick $r_0 = 0.740$; side kick (T) $r_0 = 0.858$; back kick $r_0 = 0.814$. (4) The calculation of objectivity provide the following results. (a) Front kick: the initial position: 0.709, just before take off: 0.739, foreward: 0.780, impact: 0.854, backward: 0.604, and a final position: 0.704; (b) crescent kick: initial position: 0.709, just before take off: 0.597, foreward: 0.621, impact: .736, backward: 0.542, and final position: 0.716; (c) side-kick (T): the initial position: 0.704, just before take off: 0.555, foreward: 0.689, impact: .612, and final position: 0.642; and (d) back kick: the initial position: 0.712, just before take off: 0.578, foreward: 0.649, impact: 0.692, and final position: 0.705.

Based on the results of the product development, suggestions can be presented as follows. (1) The results of the performance assessment of the kicks in Pencak Silat martial arts of the competition category can be utilized to assess the technical capability of Pencak Silat fighters in the province of Yogyakarta because it has been declared as an assessment tool that is

valid, reliable, and objective; (2) It should be tested on a larger scale in further studies to determine the assessment standard and the effectiveness of the product; (3) It is necessary to create a software that can directly analyze every performance of the kicks performed by the fighters so that all coaches can administer such a test individually.

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