Forehand Smash Test Model for Junior Badminton Athletes

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Abstract
To determine how much the exercise program success rate, a valid and reliable test tool is needed. In this study, the researcher aims to develop a smash skill test model in badminton. The method in this study is a development research method with a sample size of 121 athletes. The steps taken in this research include (1) preliminary study (literature study and field study), (2) planning (conducting analysis), (3) initial draft design, (4) validation of the draft, (5) testing of group products minor and revisions, (6) large group trials and revisions, (7) final results. This study involved academicians and badminton practitioners with an “excellent” rating, which reached an average score of 3.66. This result research is a product of the development of a smash skill test model in badminton. This study concludes that the smash skill test’s resulting form is valid and reliable, with a validity score of 0.688 and reliability of 0.870.

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INTRODUCTION

One of the sports in the world that is currently in great demand is badminton. Badminton is a type of sport for two or four players using a light racket and shuttlecock, a cork ball equipped with feathers to stabilize it (Chandigarh 2011). Following the BWF estimates, the game is played by over 200 million people worldwide, and over a thousand players participate in various competitions and tournaments around the world (Alam et al., 2010). According to (Herman Subarjah 2009), This game has developed from ancient times until now and will continue to grow as a sporting phenomenon that has succeeded in attracting public attention for various purposes or interests, both in the parts of increasing fitness, meeting recreational needs, increasing achievement as well as meeting economic needs, prestige and others.

Becoming a reliable badminton player is not easy. It requires extraordinary passion and perseverance in undergoing the training process from time to time. According to (Herman Subarjah 2016), To achieve maximum badminton performance, a systematic, tiered, and continuous training process is required and carried out with heart and diligence from an early age. (Özgur and Hotaman 2020) also added that the best performance in badminton depends not only on the physical and physiological components but also on the ability to use various hitting techniques. In badminton, there are several basic technical exercises to be mastered well, such as holding a racket, hitting shuttlecocks, and footwork control techniques. (Ngadiman and Kusuma 2020). The same is explained by (Chandigarh 2011), that the essential thing that badminton players need is the perfection of skill.

One of the hitting techniques in the badminton game that we often encounter to kill the opponent is the smash technique. According to (Junanda, Rusdiana, and Rahayu 2019), Smash is the type of blow that is the hardest and sharpest and aims to kill the opponent as quickly as possible. In the game of badminton, the smash is the most crucial thing (Mulyono 2013). Many studies have studied how to hit fast and hard smashes in the game (Ilhamdi, Sasaki, and Hadi 2015). Several studies that examine the smash hit include (Hung 2020). Hung studied the effect of different stroke exercises on the smash action of badminton players. Three conditions of punch training are considered: shadowing, target attack, and smashing. The main finding of this study is that in the smash condition, movement in the frontal plane is increased, which results in a higher load on the joints of the lower limbs.

The second is research from (Mangun, Budiningsih, and Sugianto 2017). Mangun et al. studied how to develop a smash skill training model in badminton for doubles athletes. The t-count = 11.194, df = 39, and p-value = 0.00 < 0.05, which means that there is a significant difference in athletes’ smash training before and after treating the smash training model in badminton for doubles athletes. Based on this information, it can be said that the smash training model in badminton for doubles athletes that have been developed can effectively improve skills in badminton for doubles athletes.

Third (Junanda, Rusdiana, and Rahayu 2019). Junanda et al. studied the comparison of vertical jump and front parabolic jump on accuracy and maximum speed when performing the jump smash technique. From the results of data analysis obtained several conclusions. First, there is a significant difference between the vertical jump and the forward parabolic jump on the accuracy of the shuttlecock. Second, there is a significant (significant) difference between the vertical jump and the forward parabolic jump on the shuttlecock speed, where the forward parabolic jump has better results than the vertical jump.

Then the fourth is research from (Zhang et al. 2016). Zhang et al. Conducted a study to 1) quantitatively describe the kinematic characteristics of forehand strokes using a 15-segment full-body biomechanics model, 2) examine and compare kinematic differences between novice and skilled players a focus on trunk rotation. The results confirmed that skilled players used more rod rotations than beginners. First, more rotation of the trunk causes more excellent elongation in the pectoralis major (PM) during the movement’s preparatory phase, which helps produce explosive muscle contractions. Second, the more fantastic range of motion (ROM) induced by rod rotation facilitates whip-like control sequences (proximal to distal) between body segments responsible for increasing racket speed.

There are so many studies that examine the smash hit in badminton. However, research is still rare on the development of evaluation models applied to this sport. So the researchers focused on developing a test model that can measure the level of smash technique skills and accuracy of strokes in junior badminton athletes. It is hoped that this research will be helpful for badminton coaches and athletes to conduct tests and measurements. So later it can be used as a reference because the test instrument is equipped with test
implementation procedures and the final results of the test assessment.

METHODS

This research is a type of development research with a procedural development model because it contains descriptive. This study describes a procedure that describes the steps that must be followed in producing a product file. This study involved three experts: badminton experts/players, two badminton coaches, and three badminton academic experts. Research into it on ten badminton teams in Semarang City and Wonosobo Regency with a sample of 121 athletes in the age category 10-17 years. The sampling technique was determined by purposive sampling. The procedure for developing the badminton smash test model are (1) Preliminary study (literature study and field study), (2) Planning (analysis), (3) Initial design draft, (4) validation draft, (5) Small group product test, and revision, (6) Large group trial and revision, (7) Final results.

RESULTS AND DISCUSSION

In a large-scale test, this research was carried out at badminton clubs in Semarang and Wonosobo from April to August 2018. The number of trial samples was 121 athletes. The age category of the samples ranges from 10 to 17 years. A recap of the samples of athletes used in this study can be seen in the column Table 1 below.

Table 1. Large-scale Test Samples

| Semarang Badminton Club | Sampel | Wonosobo Badminton Club | Sampel |
|-------------------------|--------|-------------------------|--------|
| Matahari Terbit         | 17     | Bina Satria Tangkas     | 8      |
| Bintang Perkasa         | 11     | Tunas Perkasa           | 7      |
| Garuda Junior           | 19     | Indoraya                | 11     |
| Gatra Pino              | 18     | Baker                   | 10     |
| Cplusco                 | 13     | ABS                     | 7      |

Experts Judgment

In assessing the quality of the badminton skills test instrument for athletes, the experts assessed the material quality aspects of the badminton smash test model with an average score of 3.66, which was included in the "good" criteria. (Sugiyono 2010). For more details, see the Table 2 below.

Table 2. Expert Validator Assessment Table

| Rated aspect | Expert Rating | Average |
|--------------|---------------|---------|
|              | 1  | 2  | 3  |       |       |
| The accuracy of the content of the test model | 3  | 4  | 4  | 3.66  |       |
| Appropriateness of components and aspects assessed | 4  | 4  | 4  | 4     |       |
| Clarity of test instructions | 4  | 3  | 3  | 3.33  |       |
| Make it easier to provide evaluation | 3  | 3  | 3  | 3     |       |
| Giving new knowledge about evaluation | 4  | 4  | 4  | 4     |       |
| It can be applied in all badminton clubs | 4  | 4  | 4  | 4     |       |
| Average   | 3.66  | 3.66  | 3.66  | 3.66  |       |

Test Development Results

The Purpose of the Forehand Smash Test is to measure the level of skill of athletes in doing smash. This test aims to hit the ball accurately to the right and left of the opponent's playing field. As previously explained by (Pritama, Sugiharto, and Rahayu 2014), the smash practice target is to get used to the smash hit with the correct technique and produce a steep shot.

Tools and Equipment: Badminton court, rackets, shuttlecocks, stationery and scoring blanks, technical implementers, score takers, ball drop supervisors, ball passing controllers over the net, and feeders.

Field Description Figure 1:

The field is lined on the right and left with the size:
Value 1: 169 cm from the centerline (area 1)
Value 2: 20 cm from line No. 1 (area 2)
Value 3: 30 cm from line No. 2 (area 3)
Value 4: 40 cm from line No. 3 (area 4)

Operating procedure; Testee stand in a rectangular line measuring 120 cm x 181 cm, located in the middle of the field. The feeder stands on the other side while giving the testee stomach feed 12 times. The testee hits a smash with a predetermined target area, namely on the right or left side of the field.

Assessment Guidelines. The assessment is carried out by combining the value of the ball's fall and the value of the technique carried out by the testee. Accuracy Test Assessment Guidelines; There is no value for strokes where the shuttle does not hit the target. The shuttlecock that falls
on the target is scored according to the predetermined value. If the shuttlecock falls between two lines, it is considered to have entered the highest value. The technical value is obtained from the attitude of the athlete when doing the test. The accuracy value is the number of values obtained from 12 trials, six on the right and six on the left. The total value is the sum of the technical value and the accuracy value.

Table 3. Smash Technique Assessment

| Stage/Step   | Score | B | S |
|--------------|-------|---|---|
| Preparation  |       |   |   |
| Shake hand grip |     |   |   |
| ready position   |     |   |   |
| Raise your shoulders and move your right leg back | |
| Racket head position facing up | |
| Focus your weight on the hind legs | |
| Transfer the weight to the front leg | |
| Keep balance with the hand that is not holding the racket. | |
| Implementation |       |   |   |
| Wrist cocks racket back. | |
| Then swing the racket to hit the shuttlecock as high and hard as possible. | |
| The arms that do not carry the racket help speed up the rotation of the body | |

Table 4. Forehand Smash Test Norms Table

| Age / Sex | Very good | Good | Enough | Less |
|-----------|-----------|------|--------|------|
| 11-12 years old | Female | 37 | 32 - 36 | 27 - 31 | 26 |
| | Male | 39 | 33 - 38 | 23 - 32 | 26 |
| 13-14 years old | Female | 40 | 34 - 39 | 29 - 33 | 28 |
| | Male | 39 | 35 - 38 | 31 - 34 | 30 |
| 17-18 years old | Female | 40 | 35 - 39 | 30 - 34 | 29 |
| | Male | 47 | 41 - 46 | 36 - 40 | 35 |

Based on the three experts, namely badminton academics, badminton coaches, and badminton players, the results obtained are excellent scores with 3.66. The score was obtained during a consultation on the manufacture of a smash test instrument product in the field. Some of the subjects that become instrument assessments include: the accuracy of the content of the test model, appropriateness of components and as-

Figure 1. Forehand Smash. Test Field (source: research document)
pects assessed, clarity of test instructions, make it easier to provide evaluation, giving new knowledge about evaluation, and can be applied in all badminton club. More details can be seen in Diagram 1.

The data above shows that the test instrument developed is proven to be valid and reliable. So that the developed test can be used as a reference in conducting tests for junior badminton athletes. Because, in the game of badminton, the smash is the most crucial thing (Mulyono 2013).

The addition of an instrument for assessing the implementation process in conducting tests can motivate athletes to study more diligently, starting from how to hold a racket well and practice accuracy. So that this theory is in line with the theory presented by (Herman Subarjah 2016), To achieve maximum badminton performance, a systematic, tiered, and continuous training process is required and carried out with heart and diligence from an early age. The same is explained by (Chandigarh 2011), that the essential thing that badminton players need is the perfection of skill.

CONCLUSION

The conclusion in this research and development is that the badminton smash test model developed is proven to be valid and reliable. According to expert judgment, this test proved to be more effective for measuring badminton skills for junior athletes in the area/non-training area with an average score of 3.66.

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