Backhand Serve Test Model for Junior Badminton Athletes

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Received April 23, 2021; Revised July 14, 2021; Accepted July 20, 2021

Abstract This study aimed at developing a backhand serve test model for junior badminton athletes. The research method used was a research and development method. The samples of the study were more than 120 athletes divided into ten badminton clubs in Central Java. This study involved academics and badminton practitioners with an excellent design validation score that reached an average score more than 3.5. The product of the research was Backhand Serve Test Model development, which was equipped with the test norms for junior badminton athletes. The Short Serve Test validity score was 0.702 and the reliability of the test score was 0.910. The developed Serve Test model is proven suitable to be used for measuring the serve skills of junior badminton athletes, because the samples of this study were athletes aged 15-18 years. Of course, the developed test model will be useful as a measuring tool for the backhand serve test for junior badminton athletes at the regional level.

Keywords Backhand Serve Test, Badminton Test Model, Junior Badminton Athletes

1. Introduction

One of the sports in the world that is currently in a great demand is badminton. Badminton is a sport for two or four players using a light racket and shuttlecock, a cork ball equipped with feathers to stabilize it [1]. Following the Badminton World Federation (BWF) estimation, the game is played by over 200 million people worldwide, and over a thousand players participate in various competitions and tournaments around the world [2]. Even in Indonesia, badminton is the most popular sport at this time [3]. This game has been developing from ancient times until now. It will continue to grow as a sporting phenomenon that has succeeded in attracting public attention for various purposes or interests, increasing fitness, meeting recreational needs, increasing achievement, and meeting economic needs, prestige, and others.

To become a reliable badminton player is not easy. It requires extraordinary enthusiasm and persistence in undergoing the training process from time to time. According to [4], in achieving a maximum badminton achievement, a systematic, tiered, and sustainable training process is needed and should be carried out with heart and diligence from an early age. The same opinion regarding the theory of training in badminton is also held by [5], the best performance in badminton depends on physical and physiological components and the ability to use various hitting techniques. Several basic technical exercises in badminton should be mastered, such as holding a racket, hitting a shuttlecock, and footwork control techniques [6]. The same thing is also explained by [1] that the most
crucial thing badminton players need is technical perfection.

One of the techniques that badminton players must acquire is the serve technique. According to [7], serve plays a vital role in a badminton game. Also, serve is a vital shot to attain because serve is the first technique to start the game and carry out attacks [8]. The same opinion is also expressed by [9] that serve is the initial basis for winning the match, because a player who cannot serve well will not get the point/score. From the mentioned opinions, it concludes that serve is a crucial technique for a badminton athlete to win a game.

Even though badminton is the most popular sport globally [10], research studying this sport is still lacking compared to other racquet sports. Several badminton experts had created test models to measure badminton backhand serve skill, including [11] and [12]. They had developed the necessary badminton technical measurement test instruments, which include: 1. Wall Volley Test, 2. Backhand Serve Test, 3. Long Serve Test, 4. Lob Stroke Test, and 5. Smash Hit Test. [13] had also modified a physical measurement test for badminton athletes used as a reference to be included in the selection of Indonesian National Team athletes.

In addition to the test model developed by badminton experts, some researchers had also carried out similar development research. The first research is [14]. This study developed a badminton long-serve test model for players aged 13-15 years. The resulting product was a long serve instrument that divided the target area into three, namely a back boundary with a value of 3 and two target areas in front of it, each measuring 0.46 m, with a value of 2 and 1. The test was carried out with a long serve for 60 times. Through the expert validation and direct test measurement, the validity was 0.83 and the reliability was 0.97. However, this study focused more on measuring long serve techniques in badminton.

The second similar research is [15]. He had developed a backhand serve test model for badminton players in the children age group, beginners, adolescents, and cadets. The result of this research was a valid and reliable backhand serve technique test model. However, this test assessed more on the result of the stroke or more on the accuracy of the serve stroke. The techniques used by players tended to be neglected and could not be considered perfect for assessing backhand serve techniques.

The third similar research is [16]. They had developed an agility test that could be used to test badminton players. The findings indicated that Bandcamp was a useful, valid, and reliable tool to measure agility, allowing coaches and athletic trainers to evaluate the player athletic condition, train the effectiveness, and possibly detect talented individuals in this sport. However, this study focused more on agility measurement, not on the technique.

The fourth similar research is [17]. This study developed tests and measurements that could be used for badminton players aged 10-12 years. In this research, the product produced was an application that could be used as a guide in conducting measurement tests for badminton players, which could be downloaded via Playstore. However, this research focused more on the player physical condition, not on the player technique.

Moreover, the fifth similar research is [18]. This study developed a test model that could measure the speed of movement of a badminton player. This research produced a sensor product to measure the player movement during badminton matches. The sensors were located at each of the 4 corners of the field. However, this test focused more on the player movement speed when competing on the field.

The developed measurements had not been specifically focused on assessing the technique proficiency because, in reality, the test only focused on the results when the ball falls (accuracy). Through the Focus Group Discussion (FGD), with ten trainers in Central Java, Indonesia, the researcher obtained data on the weaknesses of the current tests, including 1) the test only focused on assessing accuracy (not assessing technique); 2) the age group was not explained in manual and test norms, so that the norms for adults and children were not separated; 3) the tape over the net was needed, so that the testee tested backhand serve quietly and drove the shuttlecock as thin as possible over the net.

Based on the coach discussion, it was revealed that the existing test was only oriented to the result of the fall of the shuttlecock, so it did not assess the stages or techniques performed by the players. According to [19], one of the weaknesses of results-oriented measurement and evaluation is missing the observation and measurement of the accuracy of good and correct movement techniques. The assessment instrument improper use would also affect the assessment success rate because it cannot accurately measure the object being assessed [20].

Mastery of the serve is essential. Many single players prefer the backhand serve technique because it reduces the risk of an opponent attack. This study aimed to develop a Serve Test Model for junior badminton athletes to measure the technique and accuracy. This study employed research and development research. The sample size of the research was more than 120 athletes divided into ten badminton clubs in Central Java. This study involved academics and badminton practitioners with an excellent design validation score reaching an average score above 3.5. This research product was a Short Serve Test Model development equipped with a norm test for junior badminton athletes. The developed Serve Test model was expected to measure junior badminton athlete serve skills, because the samples of this study were athletes aged 15-18 years.
2. Methods

This research is a development research with a procedural development model because it contains descriptions. In this study, the researcher described a procedure that described the steps that must be followed in producing a product file. The steps taken included (1) preliminary study (literature study and field study), (2) planning (analysis), (3) initial draft design, (4) draft validation, (5) small group product test and revision, (6) trial and revision of large groups, and (7) final results. The following is a picture during the product testing on a small scale.

![Figure 1. Product test - backhand serve test model](image1)

Figure 1. Product test - backhand serve test model

Figure 2 describes the steps taken by researchers in developing the backhand serve test model. These steps included Survey and Problem Analysis, Test Instrument Design Planning, Initial Draft, Expert Validation, Data Analysis Validation, Results, Product Testing, Product Analysis, and Finish (Backhand Serve Test Model).

3. Results

In this study, the researchers intended to develop a backhand serve test model product that would later be used by junior badminton athletes in non-national training areas. The results of research on the development of the backhand serve test model are as follows.

**Product of backhand serve tests.** The purpose of the backhand serve test is to measure the athlete proficiency in the backhand serve. This test is intended for athletes in the 15-17 age group. Test tools and equipment are badminton court, racket, writing instruments, assessment blanks, shuttlecocks, ropes/ribbons, and supports. Moreover, this test involved technical implementers, namely recorders of scores, supervisors of the fall of the shuttlecock on the target, serve judge, and the shuttle taker. The sampling technique used was the purposive sampling technique. In this study, the steps taken by the researcher can be seen in Figure 2.

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A modified field for measuring the backhand serve is the standard size court with an additional line with a 20 cm distance in each of the serve lines, 26 cm for the next line distance, and 33 cm for the line distance behind it. At the top of the net, a tape is put to limit the height of the serve shot. The tape height is 19 cm from the top of the net. For more details, see Figure 3.

![Figure 3. Backhand serve test field](image2)

Figure 3 describes a modified field for measuring the backhand serve. Guidelines for carrying out the test include 1) the testee stand in the serve area with the shuttlecock at the same speed as each shuttlecock used, 2)
the testee do backhand serve 12 times in a row towards the crossed target, and 3) provides six times from the right and six times from the left.

The assessment is carried out by combining the value of the shuttlecock fall and the value of the athlete technique. In this case, there is no score for the stroke which fails to go over the net or cross the tape. The shuttlecock that falls on the target is scored according to the predetermined value. When the shuttlecock falls on the line, the highest value is taken. When the shuttle falls outside the target, it will not get a score (zero). The value of the technique is obtained from the attitude that the athlete took when doing the test. Simultaneously, the accuracy value is the total value of the ball falling obtained from 12 experiments. The total value is the sum of the technical value and accuracy value. To assess the technique, the assessment guidelines in Table 1 can be used:

| Steps          | Scoring Value | Good | Value |
|----------------|---------------|------|-------|
| Preparation    |               |      |       |
| Racket handle handshake | 1 | 0    |       |
| Stand with the heel of the back foot raised | 1 | 0    |       |
| The shuttlecock is carried at waist level | 1 | 0    |       |
| Implementation |               |      |       |
| Hit the shuttlecock with your wrist | 1 | 0    |       |
| Hit the shuttlecock close to the net | 1 | 0    |       |
| Advanced       |               |      |       |
| Continue upward racket movement | 1 | 0    |       |
| Point the racket leaf forward in the direction of the shuttlecock | 1 | 0    |       |
| Continue both arms up | 1 | 0    |       |
| Total Score    |               |      |       |
| 12             |               |      |       |

Table 1. Technical Assessment Guidelines for Backhand Serve

When the athlete did so, he got one score for each indicator. When the athlete did not do it or was wrong, he got zero. The maximum number of scores for athletes who perform all indicators entirely was 12. As a result, when displayed in the form of a figure, it will look like this.

Figure 4 is the athlete stage when performing the backhand serve technique starting from 1. Prefix, 2. Execution, and 3. Advanced Movement. The movement stages follow the guidelines for implementing the backhand test described by (21). Meanwhile, the test norms can be seen in Table 2.

| Gender | Excellent | Good | Pretty Good | Less Good |
|--------|-----------|------|-------------|-----------|
| Female | ≥ 36      | 32 - 35 | 28 - 31     | ≤ 27      |
| Male   | ≥ 41      | 36 - 40 | 31 - 35     | ≤ 30      |

The norm was obtained from testing a sample of athletes in Central Java with 121 samples of athletes who met age qualifications. Based on Table 3, it concludes that for the female player, test norms are: excellent if you get a score above 36, useful if you get a score between 32 to 35, adequate if you get a score between 28 to 31, and poor if you get a score less than 27. Meanwhile, the norms for male players are: perfect if you get a score above 41, useful if you get a score between 36 to 40, adequate if you get a score between 31 to 35, and poor if you get a score less than 30.

**Experts’ Judgment.** In this serve test model, expert judgment had provided a value according to their knowledge. They came from expert academics, expert coaches, and badminton players. Expert judgment can be seen in Table 3.

| No | Assessment Indicators | Expert Assessment | Average Value |
|----|------------------------|-------------------|---------------|
| 1. | The accuracy of the test model content | 3 | 4 | 4 | 3.66 |
| 2. | The suitability of the components and aspects being assessed | 4 | 4 | 4 | 4 |
| 3. | Clarity of test instructions | 4 | 3 | 3 | 3.33 |
| 4. | Make it easy to provide evaluation | 3 | 3 | 3 | 3 |
| 5. | Gives new knowledge about evaluation | 4 | 4 | 4 | 4 |
| 6. | Can be applied in all badminton clubs | 4 | 4 | 4 | 4 |
| Average Value | **3.66** | **3.66** | **3.66** | **3.66** |

Table 2. Backhand serve test norms

Table 3. Expert assessment
Table 3 describes expert assessments from badminton academics and expert practitioners (badminton players and coaches). The data above shows that, for the six indicators assessed, experts gave an average score of 3.66 or, categorized as “excellent”.

Figure 5 illustrates the expert judgment of the badminton academic. The data show that, of the six indicators assessed, the experts gave varied scores with an average of 3.66. And the assessments of the Badminton Coach can be seen in Figure 6.

Figure 6 illustrates the expert judgment of the badminton coach. The data show that, of the six indicators assessed, the experts had varied scores, which reached an average of 3.66.

4. Discussions

Based on the research results, the backhand serve test model developed is proven suitable to be used as a measuring skill tool for backhand serve for junior badminton athletes because the test model developed does not only include accuracy assessment but also assesses the technique of the athlete.

Backhand serve test model is relevant to the opinion [1] that the most crucial thing badminton players need is technical perfection. In this test model, the test model also contains the right methods or techniques when performing the test, not just assessing the shuttlecock final land result.

The backhand serve test model also answers the theory stated by [19] that one of the weaknesses of results-oriented measurement and evaluation is that it is missing the observation and measurement of the accuracy of displaying good and correct movement techniques.

In this backhand serve test model, apart from performing the backhand serve test according to technique, the most difficult challenge is the line at the top of the net. This is intended to limit the serve stroke height. Also, each line value around the target reached a different value depending on the athlete accuracy doing the test. This backhand serve test is also similar to the theory [22] that short serve in badminton requires a high degree of accuracy; the shuttlecock has a downward trajectory when it crosses the top of the net and forces the opponent to hit the shuttlecock again. This theory is also in line with [23] that the short serve direction is as thin as possible with the net.
In this backhand test model, eye-hand coordination and wrist technique also affect the test results. This is because this test covers the accuracy of the ball landing. This testing model is in line with [24] that short serve often uses various physical components, such as wrist flexibility and good eye-hand coordination. And [23] claims that flexibility will help the server and that the chances of getting the point would increase.

Based on the validity and reliability calculations calculated using the SPSS version 18 application on the small-scale product test, the backhand serve test validity score reached 0.702. The reliability of the test reached a score of 0.910. Based on the three expert assessments, namely academics, coaches, and badminton players, the developed backhand service test instrument received an average rating of 3.66 or, in this case, categorized as "excellent" [25]. This is because the developed backhand test model is considered to be used to measure the characteristics of junior badminton athletes.

5. Conclusion

The study developed a product of the Short Serve Test Model development, which is equipped with a test norm for junior badminton athletes. The developed Serve Test model is proven suitable to measure the serve test skills of junior badminton athletes in Central Java, Indonesia, because the samples of this study were athletes aged 15-18 years. The developed test model is useful as a serve-test measurement tool for junior badminton athletes at the regional level.

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