

# The Effect of Hand-Eye Coordination, Wrist Flexibility, and Self-Confidence on Serve Ability in Badminton on Senior High Schools Students

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## ABSTRACT

One of the objectives of student skills in sports subjects is service short in badminton training. This study focused on describes the factors that influence the students' specific skills on short serve abilities in badminton games. This research uses a path analysis design involving 60 senior high school students in Makassar. Determination of research subjects through random sampling techniques. The descriptive statistical analysis and path analysis using SPSS 16:00 for Windows to find out the research target. The results showed that hand-eye coordination (HEC), wrist flexibility (WF), and self-confidence (SC) influence the serving ability of students. The results of the indirect effect analysis show that HEC affects the serving ability through SC. The WF variable also affects student skills through their confidence.

**Keywords:** *Hand-eye coordination, wrist flexibility, confidence, short serve*

## 1. INTRODUCTION

Movement activities dominate the learning program in physical education. The learning activity of physical education is planned systematically. The program aims to develop and improve the cognitive, physical, and emotional of the student. Moreover, the educational program is based on the national education system [1], [2]. Furthermore, badminton is the one topic of learning in physical education and sports. The students are very interested in this topic because of various special events and championships that engage students. Some participants cannot apply good ways to play badminton for students who take part in the training program. Although they have been taught or trained in this technique. Many students who have long followed this training program do not show better badminton playing skills. Some students failed to perfectly express various techniques, such as long or short serve, smash, forehand, and backhand.

Based on observations In Makassar City that senior high school students much favor the badminton sport. The student's interest is the school provides an indoor badminton court, the physical education learning, and extracurricular program.

As a subject in Physical education, badminton determines the success of student studies. Furthermore, service skills become a vital part of achieving learning

objectives. In some badminton practices, there is a problem with the low ability of students in short service. This study reviews several factors that determine students' skills in short service [3].

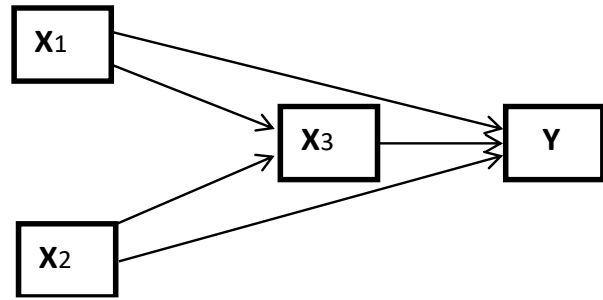
Serving as the first part in a badminton match. This skill becomes an essential point in the success of the next game [4]. Short serve is the skill of directing the shuttlecock in front of the opponent's field. This skill forces the opponent to return the ball from below, or the side deflects the shuttlecock back to the other side. This service can be done with a forehand and backhand. This short service usually uses various physical components, such as wrist flexibility and perfect hand-eye coordination. Also, student confidence will produce maximum service.

The first variable is hand-eye coordination. Coordination is a biometric capability and closely related to speed, strength, endurance, and flexibility. Competence is the ability to integrate a variety of different movements into a single pattern of movement. Hand-eye coordination in performing short serves in badminton is integration where the eye as part of the primary function holder receives stimuli. The hand of the function holder shows the movements carried out by the hand in response [5].

The second of physical components is flexibility or the quality of body flexibility. Someone who has elastic muscles has excellent flexibility. But muscle elasticity can be reduced if not doing exercise for an extended period. Activities that can increase flexibility can be stretching exercises.

**2. RESEARCH METHODS**

This research was held on one of the senior high schools in Makassar, namely SMK 6 Makassar, in early April to October 2019. The study involved 60 samples of 11<sup>th</sup>-grade students. The type of research is quantitative and used the correlational model (Figure 1).



**Figure 1** Correlational Model Information:

- X<sub>1</sub> = hand-eye coordination
- X<sub>2</sub> = flexibility of the wrist
- X<sub>3</sub> = self confidence
- Y = short serve ability.

Each variable used different data collection techniques. Table 1 shows various techniques.

**Table 1.** Collection Data

No	Variable	Data collection	Instrument	Range of Value
1	Hand-Eye Coordination	Ordinal	Ball Throwing Test (10 times the right-hand throw and ten times the left-hand throw)	0 - 20
2	Wrist Flexibility	Nominal	Bow ruler	Results of the ruler reading
3	Self Confidence	Ordinal	Questionnaire (20 questions with five answer choices)	20 - 100
4	Short Service Ability	Ordinal	Short Serve Tes (Frank M. Verduci)[6] Value 3 if the ball falls on a plot of the distance of 15.24 cm. Value 2 if the ball falls on a plot of the distance of 20.32 cm Value 1 if the ball falls on a plot of the range of 25.4 cm. Value 0 if the punch fails to cross the net. Testees were given the opportunity six times service from the left and six times on the right.	0 – 36

Ball Throwing test consists of the Target wall and test area. The target is affixed to the wall as high as the student's shoulder. The testee stands at a distance of 2.5 meters from the target wall. Next, the testee is instructed to throw the ball with one hand towards the target and try to catch it with the same side. The ball is thrown by

throwing it down, and the ball must be found before falling to the floor (Figure 2).

Data analysis using descriptive techniques by presenting tables. A correlational study using SPSS 16:00 for Windows. The path analysis test requirements that the data for all variables are normal (Table 2).

**Table 2.** The results for the normality test

Variable	KS-Z	P	α	Information
Hand eye coordination	1,217	0,103	0,05	Normal
Flexibility of the wrist	0,949	0,329	0,05	Normal
Self-confidence	0,510	0,957	0,05	Normal
Short serve capability	0,788	0, 564	0,05	Normal

### 3. RESULT AND DISCUSSION

The descriptive analysis aims to describe the maximum and minimum values and standard deviation of data for each variable (Table 3).

**Table 3.** Descriptive analysis

Variable	N	Min.	Max.	Mean	Std. Deviation
HEC	60	8	20	13.22	3.330
WF	60	22	52	34.47	9.103
SC	60	41	73	57.75	9.393
SA	60	8	32	20.23	7.574

Hand-Eye Coordination measurements produce average values of 13.22, or students can target and coordinate by hand. The minimum value of 8 and a maximum value of 20 indicated students who show a higher grade or fumble ball in throw ball. The standard deviation of 3.33 and a mean of 13.22 suggest that the data is less variable because the standard deviation is smaller than the mean. The result of measurement the wrist flexibility shows that students have excellent

flexibility. A mean value of 34.47 indicates that most students exhibit flexibility between 22 and 37.

The students' answers to the questionnaire gave a minimum value of 41 and a maximum value of 73. Student confidence while playing badminton showed a low category with a mean value between grades 46-110. None of the students had high self-confidence. The value of the student's serve ability results in a mean value of 20.23 or between classes 19 - 28. These results indicate that students have functional serving abilities. The standard deviation of 7.574 shows a relatively good variety of data, namely, diverse student skills.

#### 3.1 The results of the analysis of the direct effect between variables

Correlation analysis to determine the impact of HEC and WF variables on Self Confidence produces significance values smaller than 0.05 (table 4). The analysis result indicates a significant influence between hand-eye coordination on student confidence when playing badminton. Likewise, the relationship between Wrist flexibility and self-confidence of students.

**Table 4.** Significant Value of Direct Effect

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.301	3.199		6.345	.000
	HEC	2.266	.190	.803	11.950	.000
	WF	.217	.069	.211	3.134	.003

From the correlation analysis results, the students with better hand-eye coordination get the higher their confidence. Likewise, in wrist flexibility, the better the student's wrist's flexibility, the more confident the student is in serving on badminton practice.

Correlation analysis to determine the effect of HEC, WF, and Self Confidence variables on serving ability is presented in Table 5.

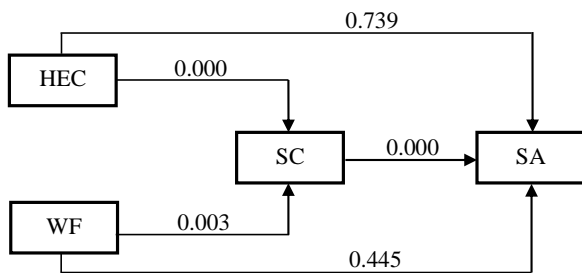
The sig value at HEC is 0.739 > 0.05, indicating that this variable does not affect serviceability. Students with good hand-eye coordination do not produce excellent skills. This is similar to the wrist flexibility variable, which shows a sig value > 0.05. Analysis of the effect of self-confidence shows the value of 0.000 < 0.05. The higher the student's self-confidence, the better the skill.

**Table 5.** Correlation Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-21.158	3.181		-6.652	.000
	HEC	.091	.270	.040	.335	.739
	WF	.044	.057	.053	.769	.445
	SC	.670	.101	.831	6.645	.000

#### 3.2. The result of path analysis

Details of the analysis of the direct and indirect effects of variables on serving abilities are presented in Figure 2.



**Figure 2** Path Analysis

The summary of the linearity coordination test, the wrist's flexibility, and confidence in short serviceability in the game of badminton on student described in Figure 2. Furthermore, the researcher calculated the indirect effect of the HEC and WF variables on the Serving ability through self-confidence. The multiplication of the significance value produces a value of 0,000 for the two lines of indirect influence. This result indicates that both variables affect serving ability through self-confidence.

In badminton, hand coordination is required to produce short services. Good hand and eye coordination will increase student confidence. Practically, a generous spirit will deliver maximum serving. Furthermore, excellent physical abilities will also affect student confidence and will produce excellent service skills.

The results showed that in badminton training, hand and eye coordination became the focus of the exercise. Physical education teachers should deliver learning methods that fit this focus. The intensive training and true mastery of techniques improved the hand-eye coordination of students.

Similarly, wrist flexibility has a contribution to student ability. Proper exercise will produce excellent flexibility. Continuing students with technical mastery and good physical potential will increase their confidence [7].

**4. CONCLUSION**

The results showed that eye-hand coordination, wrist flexibility, and self-confidence had an effect on the students' serviceability in badminton. Therefore, physical education teachers and badminton coaches must pay attention to the elements of hand-eye coordination, wrist flexibility, and student and athlete confidence.

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