Interaction between service exercise and gender on field tennis service skills

Novan Arum Nugroho ABCD*, Sapta Kunta Purnama ABCD, Slamet Riyadi ABCD,
Rony Syaifullah ABCDE

Sports Science Study Program, Faculty of Sports, Universitas Sebelas Maret, Indonesia

Authors’ Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

DOI: https://doi.org/10.58962/HSR.2023.1.4.65-72

*Corresponding Author

How to site

Abstract

The purpose of this study was to determine the interaction between service exercise and gender on field tennis service skills.

The population in this study were Faculty of Sports, Universitas Sebelas Maret students, totaling 85 male students and 27 female students. The sample used was 24 male students and 24 female students. Collecting data on tennis serve skills using the Hewitt Tennis Achievement Test. The skill of serving tennis in court tennis is the accuracy and constancy of a tennis player’s serve to start the game and being able to be skilled in serving tennis. The number of hits/ball contact with the racket is 10 hits with the target. To test the statistical hypothesis, the Tukey test was used at a significance level of α = 0.05 using SPSS 25.

The results of data analysis showed that at α = 0.05 a maximum value of 0.000 < α 0.05 was obtained, for service training a maximum average value of 28.79 was obtained and an average minimum value was obtained 27.54 while gender obtained an average maximum value of 32.04 and an average minimum value of 23.79 so that a decision could be made that reject H0 and accept H1.

So it can be concluded that there is an interaction between service training and gender on the service skills. The form of interaction shown by the results of this calculation provides a clear reason that the diversity of student characteristics will have an impact on the difference in service training, in this case a service training should pay attention to aspects of physical ability in this case gender in the implementation of training, so between service training and gender will influence each other and interact positively in the training process, especially in achieving the results of service skills which is good.

Keywords
service training, gender, service skills, tennis
Анотація

Нован Арум Нугрохо, Сапта Кунта Пурнама, Сламет Ріяді, Роні Сайфуллах. Взаємодія між якістю виконання вправи подачі та гендером при формуванні навички подачі в тенісі

Обґрунтування і мета
Метою цього дослідження було визначити взаємодію між якістю виконання подачі та гендером при формуванні навички подачі в тенісі.

Матеріал і методи
Випробувані в цьому дослідженні були студенти факультету спорту Університету Себелас Марет, загалом 85 студентів чоловічої статі та 27 студенток. Вибірка склала 24 студенти та 24 студентки. Збір даних про навички тенісної подачі за допомогою Тесту досягнень «Досягнення X’юїта в тенісі». Майстерність тенісної подачі в тенісі на корті - це точність і постійність подачі тенісиста для початку гри і вміння вправно подавати теніс. Кількість ударів/контакт м’яча з ракеткою становить 10 ударів у ціль. Для перевірки статистичної гіпотези використовувався критерій Тьюкі на рівні значущості α = 0,05 за допомогою SPSS 25.

Результати
Результати аналізу даних показали, що при α = 0,05 було отримано максимальне значення 0,000 < α 0,05, для службової підготовки було отримано максимальне середнє значення 28,79, а середнє мінімальне значення було отримано 27,54, тоді як стать отримала середнє максимальне значення 32,04 і середнє мінімальне значення 23,79, щоб можна було прийняти рішення відхилити H0 і прийняти H1.

Висновки
Отже, можна зробити висновок, що існує взаємодія між професійною підготовкою та статтю щодо службових навичок. Форма взаємодії, показана за результатами цього розрахунку, надає чітку причину того, що різноманітність характеристик студентів матиме вплив на рівні службовій підготовці, у цьому випадку службова підготовка повинна звертати увагу на аспекти фізичних здібностей, у цьому випадку стать у здійсненні навчання, тому між службовою підготовкою та статтю впливатимуть один на одного та позитивно взаємодіятимуть у процесі навчання, особливо в досягненні результатів службових навичок, що добре.

Ключові слова
технічна підготовка, гендер, технічні навички, теніс
Introduction

Exercise is the maximum approach suitable for keeping the body in top shape and healthy, further to achievement [1]. Everyone who engages in sports activities has different goals, some geared towards increasing associations, recreation, creating a life, or business. Sports offer advantages in the form of bodily and religious fitness and display disposition, personality, discipline, and sportsmanship, which can ultimately form a quality human being [2]. In Indonesia, there are many sports activities consisting of big ball sports videos, small ball sports, martial arts, gymnastics, and athletics. There are many small ball sports consisting of field tennis, table tennis, softball, baseball, and baseball.

Court tennis is a sport played between two opposite people and two opposing players each other, which is bounded by a net [3]. Each player uses a racket to hit a rubber ball. Court tennis is one of the Olympic sports and is played at all levels of society at all ages [4]. In sports men and women can be distinguished in general according to physical condition and endurance, aerobic capacity, flexibility, speed and reaction, verification of sex in competition [5,6]. In sports, men are seen as superior in general conditions for improving skills and women are less likely to improve skills [7]. With the current development in the field of sports between men and women have almost the same characteristics to improve technical skills in the field of sports. The difference to improve engineering skills in these years is getting smaller, men and women are getting more and more equal in performance improving basic engineering skills [8,9].

To be able to minimize the difference in improving basic technical skills between men and women, a trainer or teacher must be able to provide varied teaching materials. In the research conducted, technical skills between men and women a teacher should be interesting, combining, and varied. The more variety and combination of technique improvement exercises provided by teachers, the smaller the difference in technical skill improvement results between men and women [10]. With the development of the age of tennis games, there are many ways to improve the skills of coaches, tennis instructors and physical education teachers in order to train effectively and efficiently. Developing the game of tennis requires mastery of basic techniques [11]. There are many types of strokes in tennis including forehand, backhand, serve, volleyball, smash, drop shot, and lob by practicing and mastering the shot, a tennis player strives to learn and build a strong hitting foundation in the game of tennis, providing the foundation to build other strokes. Individual players who are proficient in the basics provide the foundation for effective and efficient collaboration [12,13]. For beginners, these strokes are the basic strokes of tennis, so you must master the service and forehand techniques before practicing and mastering other stroke techniques [14].

In serve, standing posture should always stand behind the baseline line [15]. The racket is tightly grasped towards the net, the weight must be balanced, the legs are stretched shoulder-width apart, and both knees are slightly bent to quickly move towards the ball we throw [16]. The neck of the racket must also be supported by the fingers of the left right hand. This reduces the load on the right hand, and also allows the left hand to rotate its shoulder left or right when the racket is pulled in preparation for taking serve to your opponent.

Serve when done well can be the key to victory, because success in serve to get points is greater than defensive hitting. If the serve is weakened, the chances of getting points will decrease, because the opponent can attack and have the opportunity to earn points when attacking. So you can know that a serve is not only a hit to start the game but can also be a hit that can get points [17,18]. A serve is required to start a tennis match. Starting serve or punch is not considered important, initially serve is only considered as a bat to put the ball into the opponent's area as a sign at the beginning of the match with a strong and accurate serve the player can start an attack to urge the opponent. And also serve is the initial capital that must be mastered [19].

Material and methods

The research method used in this study is an experimental method. The basis for using this method is an experimental activity that begins with giving treatment to subjects which ends with a form of test to determine the effect of the treatment that has been given. The purpose of experimental research is to examine whether there is a causal relationship by giving treatment to experimental groups whose results are compared with the results of control groups that are not given treatment or given different treatment (Table 1) [20].
Table 1

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Service Training (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (B)</td>
<td>Grip Eastern (A1)</td>
</tr>
<tr>
<td>Male (B1)</td>
<td>A1B1</td>
</tr>
<tr>
<td>Female (B2)</td>
<td>A1B2</td>
</tr>
<tr>
<td>Grip Continental (A2)</td>
<td>A2B1</td>
</tr>
</tbody>
</table>

Information:
A1B1 : Group of male students with Grip Eastern
A1B2 : Group of female students with Grip Eastern
A2B1 : Group of male students with Grip Continental
A2B2 : Group of female students with Grip Continental

The population in this study were Faculty of Sports, Universitas Sebelas Maret students, totaling 85 male students and 27 female students. The sample used was 24 male students and 24 female students. Collecting data on tennis serve skills using the Hewitt Tennis Achievement Test. The skill of serving tennis in court tennis is the accuracy and constancy of a tennis player’s serve to start the game and being able to be skilled in serving tennis. The number of hits/ball contact with the racket is 10 hits with the target. To test the statistical hypothesis, the Tukey test was used at a significance level of \( \alpha = 0.05 \) using SPSS 25.

Results

Data Normality Test

The Liliefors method was used in the normality test of this study, with the caveat that H0 means the population is normally distributed and H1 means it is not normally distributed. Probability serves as the basis for decision making; if the probability value > \( \alpha \) 0.05 then H0 is accepted. H0 is rejected if the probability value is less than \( \alpha \) 0.05 (Table 2).

<table>
<thead>
<tr>
<th>No.</th>
<th>Group</th>
<th>N</th>
<th>( L_{\text{count}} )</th>
<th>( L_{\text{table}} )</th>
<th>Sig. (p)</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A1</td>
<td>24</td>
<td>0.219</td>
<td>0.319</td>
<td>0.004</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Overall the Liliefors value (\( L_{\text{count}} \)) is smaller than the Liliefors Value (\( L_{\text{table}} \)) table, as can be seen in table 1. Thus, it can be concluded that the study sample came from a population with a normally distributed population. This conclusion indicates that the hypothesis proposed in this study can be tested using parametric statistical analysis, indicating that the first requirement for hypothesis testing has been fulfilled.

Homogeneity Test

To test whether there is a difference in mean values between treatment groups, the data must meet the hypothesis that the variance is homogeneous. In which the notion of homogeneity is advanced as follows:
\[ H_0 \] is rejected if \( X^2_{\text{count}} > X^2_{\text{table}} \)
\[ H_0 \] is accepted if \( X^2_{\text{count}} < X^2_{\text{table}} \)

The results of the analysis for the homogeneity of variance test on the four groups of experimental design cells were carried out with the Barlett test at the level of \( \alpha = 0.05 \). Recapitulation of the results of the homogeneity analysis with the Barlett test using the One way Anova test of homogeneity of variances analysis is presented in table 3 below.

Table 3

Recapitulation of the service skill variance homogeneity test for the eight groups of experimental design cells

<table>
<thead>
<tr>
<th>Group</th>
<th>( X^2 )</th>
<th>( X^2_{\text{table}} )</th>
<th>Sig. (p)</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>A + B</td>
<td>1.361</td>
<td>51.805</td>
<td>0.255</td>
<td>Homogen</td>
</tr>
</tbody>
</table>

This test produces a signal that the value of \( X^2_{\text{count}} = 1.361 \) is smaller than \( X^2_{\text{table}} = 51.805 \) with a significant level (p) = 0.361 so that the Levene test findings are shown with a value of 1.361 and p = 0.255 > \( \alpha \) 0.05. Based on the analysis requirements test above, it is concluded that further analysis can be carried out.
Hypothesis Testing

Based on the results of the analysis of variance in table 3 above it can be explained as follows:

Recapitulation of the ANOVA results of service skills

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>1795.333</td>
<td>7</td>
<td>256.476</td>
<td>92.147</td>
<td>0.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>34561.333</td>
<td>1</td>
<td>34561.33</td>
<td>12417.246</td>
<td>0.000</td>
</tr>
<tr>
<td>A</td>
<td>1302.083</td>
<td>1</td>
<td>1302.083</td>
<td>467.814</td>
<td>0.000</td>
</tr>
<tr>
<td>B</td>
<td>184.083</td>
<td>1</td>
<td>184.083</td>
<td>66.138</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Note: R Squared = 0.942 (Adjusted R Squared = 0.931)

- There is a significant difference between the training group on serving skill (F-count = 467.18 > F-table for degrees of freedom 1 and 40 and a value of 4.05) or F-count > F-table, with a significant level of 0.000 less than α 0.05 (0.000 < α 0.05), so the F test can be used to determine whether the proposed hypothesis is accepted.
- There is a significant difference between gender on service skills (F-count = 66.138 > F-table for degrees of freedom 1 and 40 and a value of 4.05) or F-count > F-table, with a significant level of 0.000 less than α 0.05 (0.000 < α 0.05), so the F test can be used to determine whether the proposed hypothesis is accepted.

Based on these conclusions, statistical calculations were then carried out using SPSS 25 analysts to test the research hypothesis (advanced test) using the Tukey test.

The calculation of variance analysis carried out in testing the hypothesis of the interaction of this study with calculations through first-level variance sources and with calculations of variance sources for the level of combination of the groups compared. For the results of interaction analysis can be seen in table 5 below:

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Maximum</th>
<th>At least</th>
<th>Sig.</th>
<th>Coolness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. AxB</td>
<td>28.79</td>
<td>27.54</td>
<td>0.000</td>
<td>Interaction Occurs</td>
</tr>
<tr>
<td></td>
<td>32.04</td>
<td>23.79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of the analysis of the interaction between service training and gender on the service skills

The results of data analysis showed that in table 4 showed that at α = 0.05 a maximum value of 0.000 < α 0.05 was obtained, for service training a maximum average value of 28.79 was obtained and an average minimum value was obtained 27.54 while gender obtained an average maximum value of 32.04 and an average minimum value of 23.79 so that a decision could be made that reject H0 and accept H1. So it can be concluded that there is an interaction between service training and gender on the service skills. Thus, the results of the hypothesis test proved that there was an interaction between service training and gender on the service skills.

Discussion

With the development of the tennis game era, there are many ways to improve the skills of trainers, tennis instructors and physical education teachers so they can train effectively and efficiently [21]. Developing a tennis game requires mastering basic techniques. There are many types of strokes in tennis including forehand, backhand, serve, volley, smash, drop shot, and lob. By practicing and mastering strokes, a tennis player tries to learn and build a solid foundation of strokes in the game of tennis, providing a basis for building other strokes. A reliable tennis player is a tennis player who serve well [22]. For beginners, these strokes are the basic strokes of tennis, so you must master the serve and forehand techniques before practicing and mastering other stroke techniques.

As a major component that volume is an important quantitative prerequisite for high tactical and especially performance. Training volume is a measure that indicates the amount or quantity of the degree of a stimulus that can be addressed by the number of repetitions, series or sets and the length of the distance traveled. While repetition is the repetition of the motion the number of times the athlete has to do the movement each turn. Increasing the volume of training is the culmination of training in all sports that have an aerobic component and
also in sports that demand technical perfection or tactical skills. The process of learning complicated abilities by being broken down into smaller tasks so that intervals of time between practice sessions are shorter is known as the progressive approach of teaching skills [23]. Practice is necessary. Since interval exercises aid in the facilitation of learning, students will be motivated to learn progressively and hone abilities that are appropriate for the actual game environment. Good interval training, to improve technique skills using interval training 1:1 and 1:3 [24].

The intensity of the training is a very important component to be associated with the qualitative component of the work carried out in a given time period [25]. The more work done in a unit of time, the higher the intensity. Intensity is a function of the strength of the nerve stimulation carried out in the exercise, and the strength of the stimulus depends on the load, speed of movement, variation of intervals or rest between each repetition. Intensity is a measure that shows the level or level of energy expenditure of athletes in physical activity both in training and competition.

The results of the exercise can be achieved optimally, so the intensity of the exercise given should not be too high or too low. If the intensity of an exercise is inadequate or too low, then the effect of the exercise is very small or even nonexistent. Conversely, if the exercise intensity is too high, it can cause injury [26]. The planned rest interval between two stimuli depends directly on the intensity and duration of each stimulus. The problem of time for these exercises depends on the frequency of time limits for intensive skill-building exercises. For beginners with a training frequency of twice a week can improve skills, with quality and optimize training [27]. What can be concluded is that in order to improve the skills of a technique in each sport, it requires 12 meetings with a minimum training frequency of twice a week. Complex or difficult technical skills may create problems and eventually cause additional stress on the muscles, especially during stages when neuromuscular coordination is weak. An individual group overview of complex skills, can quickly distinguish between those who have good coordination and those who do not. The more difficult the form of exercise, the greater the individual differences and the efficiency of the mechanism.

**Conclusion**

The results of data analysis showed that at \( \alpha = 0.05 \) a maximum value of \( 0.000 < \alpha 0.05 \) was obtained, for service training a maximum average value of 28.79 was obtained and an average minimum value was obtained 27.54 while gender obtained an average maximum value of 32.04 and an average minimum value of 23.79 so that a decision could be made that reject H0 and accept H1. So it can be concluded that there is an interaction between service training and gender on the service skills. The form of interaction shown by the results of this calculation provides a clear reason that the diversity of student characteristics will have an impact on the difference in service training, in this case a service training should pay attention to aspects of physical ability in this case gender in the implementation of training, so between service training and gender will influence each other and interact positively in the training process, especially in achieving the results of service skills which is good.

**Conflict of interest**

The authors state that there are no conflicts of interest.

**References**


15. Novan Arum Nugroho

Novan Arum Nugroho
novanarumn28@student.uns.ac.id
http://orcid.org/0009-0006-2702-4661
Sports Science Study Program, Faculty of Sports, Universitas Sebelas Maret
Ir. Sutami Street Number 36, Kentingan, Kec. Jebres, Surakarta City, Central Java 57126, Indonesia

Sapta Kunta Purnama

Sapta Kunta Purnama
saptakunta_p@yahoo.com
http://orcid.org/0000-0001-7198-1385
Sports Science Study Program, Faculty of Sports, Universitas Sebelas Maret
Ir. Sutami Street Number 36, Kentingan, Kec. Jebres, Surakarta City, Central Java 57126, Indonesia

Information about authors
Slamet Riyadi
slametriyadi70@staff.uns.ac.id
http://orcid.org/0000-0002-6403-7051
Sports Science Study Program, Faculty of Sports, Universitas Sebelas Maret
Ir. Sutami Street Number 36, Kentingan, Kec. Jebres, Surakarta City, Central Java 57126, Indonesia

Rony Syaifullah
ronysyaifullah@staff.uns.ac.id
http://orcid.org/0000-0002-6480-8098
Sports Science Study Program, Faculty of Sports, Universitas Sebelas Maret
Ir. Sutami Street Number 36, Kentingan, Kec. Jebres, Surakarta City, Central Java 57126, Indonesia

Інформація про авторів

Нован Арум Нугрохо
novanarumn28@student.uns.ac.id
http://orcid.org/0009-0006-2702-4661
Програма вивчення спортивних наук, факультет спорту, Університет Себелас Марет
Ir. Sutami Street Number 36, Kentingan, Kec. Джебрес, місто Суракарта, Центральна Ява 57126, Індонезія

Сапта Кунта Пурнама
saptakunta_p@yahoo.com
http://orcid.org/0000-0001-7198-1385
Програма вивчення спортивних наук, факультет спорту, Університет Себелас Марет
Ir. Sutami Street Number 36, Kentingan, Kec. Джебрес, місто Суракарта, Центральна Ява 57126, Індонезія

Сламет Ріяді
slametriyadi70@staff.uns.ac.id
http://orcid.org/0000-0002-6403-7051
Програма вивчення спортивних наук, факультет спорту, Університет Себелас Марет
Ir. Sutami Street Number 36, Kentingan, Kec. Джебрес, місто Суракарта, Центральна Ява 57126, Індонезія

Роні Сайфуллах
ronysyaifullah@staff.uns.ac.id
http://orcid.org/0000-0002-6480-8098
Програма вивчення спортивних наук, факультет спорту, Університет Себелас Марет
Ir. Sutami Street Number 36, Kentingan, Kec. Джебрес, місто Суракарта, Центральна Ява 57126, Індонезія

This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0)

Received: 2023-06-05    Accepted: 2023-07-11    In press: 2023-10-02    Published: 2023-10-25