

Assessment of Volleyball Underhand Serve Proficiency among Students at SMAN 3 Seluma Bengkulu

Annisa Pramadanita^{1*}

¹Universitas PGRI Palembang

*Corresponding author: annisaprmndnt09@gmail.com

Abstrak

Penelitian ini bertujuan untuk menilai kemampuan servis bawah tangan dalam voli di kalangan siswa SMA Negeri 3 Seluma Bengkulu sebagai landasan untuk mengevaluasi pengajaran Pendidikan Jasmani. Penelitian ini menggunakan metode deskriptif kuantitatif dengan 32 peserta dari kelas X. Data dikumpulkan melalui penilaian keterampilan dasar servis, di mana setiap siswa diberi kesempatan sepuluh kali untuk melakukan servis. Hasil penelitian menunjukkan bahwa kemampuan servis siswa bervariasi, dengan persentase tertinggi diklasifikasikan sebagai memadai (34,4%), diikuti oleh baik (28,1%), buruk (18,8%), luar biasa (12,5%), dan sangat buruk (6,2%). Data menunjukkan bahwa sebagian besar siswa memahami prosedur dasar servis bawah; namun, mereka kesulitan untuk melaksanakan gerakan secara konsisten dan stabil. Faktor-faktor yang mempengaruhi kinerja meliputi kekuatan otot lengan yang tidak memadai, koordinasi tubuh yang belum berkembang, dan intensitas latihan yang tidak cukup. Oleh karena itu, penting untuk meningkatkan proses pembelajaran melalui latihan berulang, demonstrasi yang sesuai, dan umpan balik sistematis untuk memfasilitasi pengembangan teknik dasar layanan yang optimal.

Kata kunci: Pendidikan jasmani, voli, servis bawah, keterampilan motorik, kemampuan siswa.

Abstract

This study seeks to assess the proficiency of the volleyball underhand serve among students at SMAN 3 Seluma Bengkulu as a foundation for evaluating Physical Education instruction. The research employed a quantitative descriptive methodology with 32 participants from class X. Data was gathered using a basic service skills assessment, in which each student was afforded ten opportunities to do service. The findings indicated that students' service competence varied, with the highest percentage classified as adequate at 34.4%, followed by good at 28.1%, poor at 18.8%, exceptional at 12.5%, and extremely poor at 6.2%. The data suggest that the majority of students comprehend the fundamental procedures of lower service; nonetheless, they struggle to execute motions consistently and with stability. Factors that influence performance include inadequate arm muscular strength, underdeveloped body coordination, and insufficient intensity of targeted training. Consequently, it is essential to enhance learning processes via repetitive exercises, suitable demonstrations, and systematic feedback to facilitate the best development of foundational service techniques.

Keywords: Physical education, volleyball, underhand serve, motor skills, student proficiency.

1. INTRODUCTION

Physical education is an essential part of the school curriculum that plays a strategic role in shaping motor skills, improving physical fitness, developing movement skills, and instilling a sportsmanlike attitude in students (Sukardi, 2022; NCFE, 2023; GraduateProgram, 2025). Through structured activities, physical education is increasingly recognized as a key component in the holistic development of students, encompassing physical, cognitive, and social-emotional aspects (Durden Myers, 2025; National Academies, 2013; Stratified Fitness

History:

Received : 2 March 2026
Revised : 2 March 2026
Accepted : 4 March 2026
Published : 8 March 2026

Publisher: Horizon Edukasi Prima Indonesia

Licensed: This work is licensed under a Creative Commons Attribution 4.0 License



Group, 2025). Through planned exercises, physical education not only supports physical fitness but also encourages lifelong physical activity habits in adolescents (Clemente et al., 2020; UNESCO, 2023; Vidoni et al., 2020).

Through the learning process of physical education, students are not only guided to master sports techniques and activities, but also directed to internalize character values such as cooperation, discipline, a sense of responsibility, and honesty when competing (Perdima & Kristiawan, 2021; Widyanto, 2024; Zulchrif & Cahyadi, 2023). Character education has been explicitly embedded in national and school level curricula, where physical education is positioned as a strategic medium for instilling the values of discipline, cooperation, honesty, and a sense of responsibility (Fitri et al., 2020; UNESCO, 2023; Perdima, 2023). Various studies show that well-designed physical education programs can improve sportsmanship, compliance with rules, and respect for opponents (Vidoni et al., 2020; Georgiev, 2025; Lukas, 2024). In addition, physical education provides opportunities to practice leadership, teamwork, and emotional control in a competitive context (Prasetyo, 2021; Lukas, 2024; *Fostering Exemplary Character*, 2024).

One form of sports activity that is often used as a learning material for physical education is the game of volleyball. This game is increasingly popular in the school environment because the rules are easy to understand, can be played in groups, and are able to foster a sense of togetherness and cohesiveness between students (Sari, 2020; Zulchrif & Cahyadi, 2023; Lukas, 2024). Volleyball is widely used in PJOK learning because it requires teamwork, communication, and a clear division of roles among players (Widyanto, 2024; Perdima, 2023; Sport Area, 2024). Team ball games such as volleyball have been proven effective in developing a sense of togetherness, shared responsibility, and social support among students (Zulchrif & Cahyadi, 2023; Lukas, 2024; National Academies, 2013).

Volleyball itself is a game sport that requires good coordination of gestures, muscle strength support, and mastery of basic techniques (Ramadhani & Nugroho, 2020; *Volleyball Strength Program*, 2025). The basic techniques in volleyball include passing, smashing, blocking, and serving (Javelin Sports, 2024; Javelin Sports, 2025; St. Paul Parks, 2025). Among the four techniques, service has a very important role because it is the opening phase of every game (Callupe et al., 2022; Clemente et al., 2020; *Volleyball Strength Program*, 2025). A well done service can provide an advantage for the team, both to start an attack pattern and to pressure the opponent so that it is difficult to develop a game strategy (Callupe et al., 2022; St. Paul Parks, 2025; Sport Area, 2024). For beginner players, the type of service that is more often taught is the bottom serve, because this technique is relatively simpler and easier to master than the top service or jump service (Mardiana, 2025; Fakbar, 2024; Yulianto, 2022) A literature review shows that the underhand serve is a very important basic skill for beginners, and its success is greatly influenced by correct movement patterns, body coordination, and motor control (Sari, 2020; Gifan et al., 2024; Callupe et al., 2022).

The real conditions in the field show that there are still many students who are not able to perform the underhand serve optimally. Various factors can be the cause, including a lack of understanding of the stages of movement, weak strength of the arm and wrist muscles, poor body coordination, and a lack of exercises that are carried out regularly and structured (Sari, 2020; Clemente et al., 2020; *Volleyball Strength Program*, 2025). Research on elementary and middle school students found that underhand serve ability is closely related to physical condition, technical accuracy, and psychological factors such as confidence and

concentration (Clemente et al., 2020; Callupe et al., 2022; Fakbar, 2024). Studies also show that poor underhand serve mastery is often associated with monotonous teaching methods, limited practice opportunities, and minimal feedback from teachers (Gifan et al., 2024; Mardiana, 2025; Effort Increase Study, 2024). As a result, students may experience difficulty in controlling the direction and power of the ball, which leads to frequent errors during games (Sari, 2020; Kinestetik Survey, 2024; JPJO, 2023).

The inability to serve correctly causes the game to not run effectively, because the ball often does not pass through the net or the direction of the shot is not right, thus providing a great opportunity for the opponent to counterattack (JPJO, 2023; Kinestetik Survey, 2024; Sport Area, 2024). Quantitative analyses of serve reception biomechanics indicate that inconsistent serving reduces the predictability of the first contact and increases the risk of unforced errors (Callupe et al., 2022). Evidence based studies on basic volleyball training further emphasize that poor technical execution in essential skills, such as underhand serving, can significantly limit the quality of game performance, especially in school settings (Gifan et al., 2024; Stamina, 2025; St. Paul Parks, 2025).

SMAN 3 Seluma Bengkulu as one of the high school education units also includes volleyball learning in physical education activities. The results of the initial observation showed that there was a difference in students' ability to perform lower service techniques. Some students are able to do it well and consistently, while others still face obstacles in regulating the power and direction of the ball. This condition shows the need for further analysis to determine the level of student mastery of the basic technique. Similar findings have also been reported among junior high and high school students in various regions, showing variations in underhand serving skills ranging from poor to adequate (Kinestetik Survey, 2024; JPJO, 2023; Gifan et al., 2024). This underscores the importance of systematic assessment and targeted intervention in volleyball instruction at schools (Widyanto, 2024; Sport Area, 2024; Stamina, 2025).

Under service capability analysis is an important step to identify the extent to which students master the technique. Through this analysis activity, teachers can find out aspects that still need to be improved both in terms of teaching methods, frequency of exercises, and learning approaches applied (Gifan et al., 2024; Fakbar, 2024; Effort Increase Study, 2024). In addition, the results of the analysis can be the basis for designing a more effective and targeted exercise program (Mardiana, 2025; Yulianto, 2022; Stamina, 2025). Research on the ability to serve below has an important role because mastering these basic techniques is the foundation for other volleyball skills (Clemente et al., 2020; Callupe et al., 2022; Volleyball Strength Program, 2025). If students are not able to master the service well, it will have an impact on the overall low quality of the game (JPJO, 2023; Kinestetik Survey, 2024; Sport Area, 2024). On the other hand, good service skills can increase students' confidence when participating in learning or when competing in school competitions (Prasetyo, 2021; Fostering Exemplary Character, 2024; Lukas, 2024).

This research is expected to contribute to improving the quality of physical education learning in schools. By understanding students' initial abilities, teachers can develop learning models that are more creative, interactive, and relevant to the character of students (Fitri et al., 2020; Widyanto, 2024; Fostering Exemplary Character, 2024). This is in line with the goal of national education which emphasizes the balance of development of cognitive, affective, and psychomotor aspects (Fitri et al., 2020; UNESCO, 2023; Durden Myers, 2025).

Studies in Indonesia show that integrating character values into physical activities can improve discipline, cooperation, and sportsmanship while also improving motor performance (Perdima, 2023; Lukas, 2024; Zulchrif & Cahyadi, 2023). Furthermore, research on post-pandemic physical fitness indicates that targeted interventions in physical education can help reduce disparities in motor competence and physical fitness among students (Stratified Fitness Group, 2025; Clemente et al., 2020; UNESCO, 2023).

Thus, the research entitled “Analysis of Volleyball Bottom Service Ability in SMAN 3 Seluma Bengkulu Students” was carried out to obtain a comprehensive picture of students' skills in performing bottom serves, identify influencing factors, and provide recommendations that can be used in improving the quality of learning basic volleyball techniques (Gifan et al., 2024; JPJO, 2023; Kinestetik Survey, 2024). Previous studies on underhand serve ability and related training models have demonstrated that game-based learning, targeted drills, and feedback-rich environments can significantly improve students' serving skills and motivation (Mardiana, 2025; Fakbar, 2024; Effort Increase Study, 2024). These findings support the need for context-specific analyses of students' volleyball service abilities in different school settings, including SMAN 3 Seluma Bengkulu (Stamina, 2025; Sport Area, 2024; Widyanto, 2024).

2. METHOD

This study uses a quantitative descriptive approach that aims to find out and describe the ability of volleyball bottom service in students of SMAN 3 Seluma Bengkulu. The research subjects consisted of 32 students of class X who participated in Physical Education learning. Data collection was carried out through a service skills test, where each student was given the opportunity to conduct 10 service experiments. Each ball that manages to pass through the net and enter the opponent's area of play earns a score of 1 point, while a hit that fails is not awarded a point. The test results are then recorded to get each student's ability score.

The collected data was analyzed using descriptive statistics in the form of percentages to determine the distribution of students' abilities in the categories of excellent, good, adequate, lacking, and very poor. The percentage calculation is done using the formula:

$$P = \frac{f}{N} \times 100\%$$

where P is the percentage, f is the number of students in each category, and N is the total number of students which is 32 people. The results of this analysis are used to provide a clear picture of the level of mastery of the lower service technique and become the basis for providing recommendations for learning improvement.

3. RESULTS AND DISCUSSION

The implementation of the lower service ability test for SMAN 3 Seluma Bengkulu students was carried out by giving each student 10 times the opportunity to serve in the direction of the opponent's field. Success is calculated based on the number of balls that are able to pass through the net and land precisely in the opponent's area of play. This assessment is intended to see the extent to which the mastery of the basic technique of the lower service has been mastered by the students, considering that this skill is the initial component that determines

the course of the game strategy in volleyball. The results of the measurements obtained are then processed and grouped into several categories of abilities to provide a clearer picture of the level of achievement of students. The results of students' abilities can be seen in the following table.

Table 1. Ability Categories Score Range Frequency (F) Percentage (%)

Excellent	9 – 10	4 Students	12,5%
Good	7 – 8	9 Students	28,1%
Enough	5 – 6	11 Students	34,4%
Less	3 – 4	6 Students	18,8%
Very Less Sum	0 – 2	2 Students	6,2%
		32 Students	100%

From the results of this percentage, it can be seen that the most ability category is the Adequate category at 34.4%, while the least category is Very Insufficient at 6.2%. This shows that most students are at an intermediate level of ability to perform volleyball bottom serves.

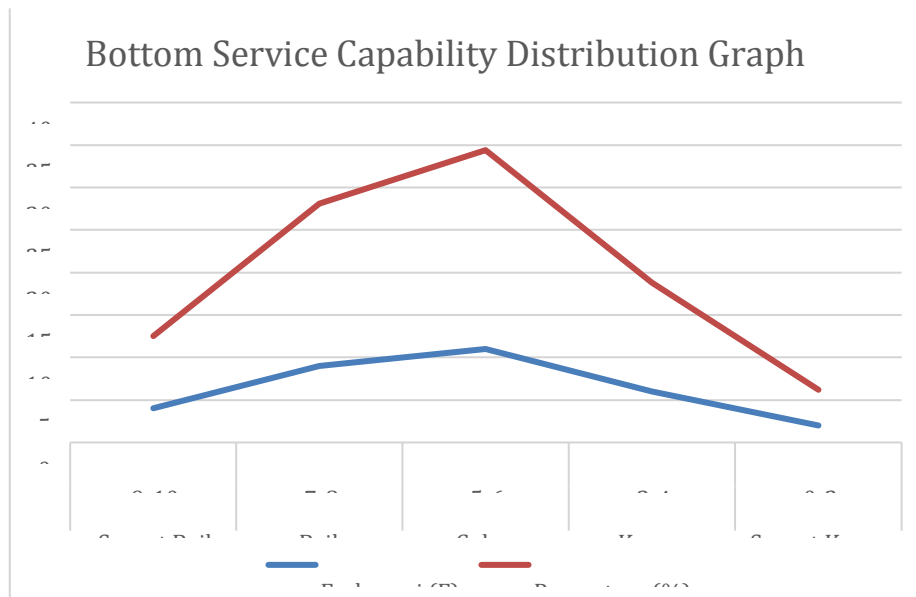


Figure 1. Bottom Service Capability Distribution Graph

The graph shows that most students fall into the adequate ability category, indicating that they have understood the basics of technical services but are not yet able to perform them consistently. Some students have achieved good to excellent skills, enabling them to perform services more accurately and effectively, while others are still in the poor to very poor category, indicating that they still experience difficulties in striking power, movement

coordination, and overall mastery of basic techniques. Therefore, more focused learning and practice are needed so that students' basic service skills can develop evenly.

The results of the study showed that the lower service ability of volleyball students of SMAN 3 Seluma Bengkulu was at a varied level with a dominant tendency in the sufficient category. This condition indicates that some students already have a basic understanding of the lower service technique, but are not yet fully able to execute it consistently. Factors that can affect this include suboptimal arm strength, unstable coordination of body movements, and lack of continuous frequency of intensive exercises in the learning process.

In addition, there are 12.5% of students who are in the very good category, which shows that some students are able to provide good and accurate service. Meanwhile, students are still found in the category of less to very lacking, which shows that teachers need to pay more attention in terms of learning approaches, emphasis on movement techniques, and variety of exercises. Learning that is carried out gradually, accompanied by clear demonstrations, repeated exercises, and consistent evaluation and feedback, is indispensable to improve students' service skills. Thus, improving the quality of learning and more structured exercises can help students master bottom serve techniques more optimally, and these improvements show that the learning methods applied, including the use of modified balls, are effective in strengthening students' understanding and skills in performing volleyball bottom serve techniques (Aldiwa et al., 2025).

4. CONCLUSIONS

This study shows that the volleyball service ability of SMAN 3 Seluma Bengkulu students is at various levels, with the majority tending to be in the sufficient category. This indicates that most students have understood the basic techniques of lower service, but the implementation has not been carried out in a stable and consistent manner. The difference in ability between students is influenced by several factors such as arm muscle strength, coordination of movements, understanding of the stages of technique, and the intensity of training that is not optimal. Therefore, more structured learning efforts are needed through the improvement of teaching methods, the provision of directed repetitive exercises, clear movement demonstrations, and continuous feedback so that students' service skills can develop more evenly and optimally.

5. ACKNOWLEDGEMENT

The author would like to thank the parties who have provided support in this research. The author also expressed his appreciation to SMP Negeri 2 Sanga Desa for providing permits and facilities for the implementation of research. This research was prepared by the author as a student of the Master of Physical Education Study Program, University of PGRI Palembang, and will not be completed without the guidance, direction, and support of supervisors and peers.

6. REFERENCES

Atmoko, A. P., Lusianti, S., Rofi'ussya'en, M., Atmoko, D., Watiningsih, P., & Atmoko, B. Z. (2025). Pengaruh modifikasi bola terhadap hasil belajar service bawah bola voli pada peserta didik kelas VII E di SMPN 7 Kediri. *Jurnal Pengabdian Masyarakat dan Riset Pendidikan*, 3(4), 936–940. <https://doi.org/10.31004/jerkin.v3i4.524>

- Callupe, R. L., Chau, J. M., Garcia, J. G., Chicoma, C. G., Arrese, C. F., Artieda, M. H., Elias, D. A., & Villota, E. R. (2022). Testing protocol for evaluating underhand serve reception biomechanics in volleyball. *International Journal of Sports Science & Coaching*, 17(4), 789–798.
- Clemente, F. M., van der Linden, C. M. A., & Sarmiento, H. (2020). The role of physical education in developing fundamental movement skills and sportsmanship among adolescents. *Journal of Physical Education and Sport*, 20(3), 1124–1131.
- Durden Myers, E. (2025). The future of physical education: Curriculum and policy perspectives. *Physical Education and Sport Pedagogy*, 30(1), 1–15.
- Effort increase results study service lower on volleyball game through approach learning collaboration. (2024). *Proceeding International Conference on Education Research and Innovation*, 4(1), 120–129.
- Fakbar, M. (2024). Improving underhand serve ability in volleyball through the drill method. *Proceeding International Conference on Education*, 3(1), 1–10.
- Fitri, R., Sulaiman, F., & Nurhayati, S. (2020). Development of physical education model based on character for improving affective, cognitive, and psychomotoric values in elementary school. In *Proceedings of the International Conference on Educational Research and Innovation (ICERI 2019)* (pp. 35–40). Atlantis Press.
- Georgiev, M. (2025). Research on the orientation to sportsmanship in students—future physical education teachers. *Trakia Journal of Sciences*, 23(1), 45–52.
- Gifan, A., Sari, D., & Prasetyo, A. (2024). Analisis strategi dan teknik servis bawah dalam permainan bola voli: A systematic literature review. *International Journal of Management*, 6(2), 200–212.
- GraduateProgram.org. (2025, August 14). *Why physical education is as important as academics*. GraduateProgram.org Blog.
- Improving volleyball underhand serve learning outcomes through the play method. (2025). *Competitor: Jurnal Pendidikan Kepeleatihan Olahraga*, 17(2), 90–100.
- Javelin Sports. (2024, January 25). *Proper underhand serve technique in volleyball*. Javelin Sports Inc.
- Javelin Sports. (2025). *The six basic fundamentals in volleyball*. Javelin Sports Inc.
- JPJO. (2023). Ability of lower serve in volleyball among class VIII A students of SMP Muhammadiyah 05 Surakarta. *Jurnal Pendidikan Jasmani dan Olahraga*, 8(2), 50–60.
- Kinestetik: Jurnal Ilmiah Pendidikan Jasmani. (2024). Survey of volleyball underhand serve and underarm of students at SMP Negeri 1 Siak Hulu. *Kinestetik: Jurnal Ilmiah Pendidikan Jasmani*, 8(1), 10–20.

- Lukas, M. (2024). Integration of sportsmanship and cooperation values through physical education in elementary schools. *Shooting: Journal of Sport Education*, 5(1), 20–30.
- Mardiana. (2025). Improving underarm serving ability in volleyball games through target game approach in grade 5 students of SDN 127 Inpres Moncongloe. *Competitor: Jurnal Pendidikan Kepeleatihan Olahraga*, 17(1), 45–55.
- National Academies of Sciences, Engineering, and Medicine. (2013). Approaches to physical education in schools. In *Educating the student body: Taking physical activity and physical education to school* (Chapter 5). National Academies Press.
- NCFE. (2023). *Importance of physical education in school*. National Centre for Excellence Blog.
- Perdima, A. (2023). Values of physical education and sports as character building media in Indonesian schools. *Journal of Physical Education, Sport, Health and Recreations*, 12(1), 1–10.
- Perdima, A., & Kristiawan, M. (2021). Fostering exemplary character through physical activities in physical education learning. *Champions: Journal of Physical Education and Sports*, 5(1), 1–13.
- Prasetyo, A. (2021). Psychological factors affecting underhand serve performance in volleyball. *Journal of Sports Psychology*, 3(2), 45–55.
- Ramadhani, R., & Nugroho, A. (2020). The role of basic volleyball skills in developing motor competence among high school students. *Jurnal Pendidikan Jasmani dan Olahraga*, 5(1), 30–40.
- Sari, D. (2020). The contribution of physical condition on underhand serve ability in volleyball of elementary students. *Journal of Physical Education*, 1(1), 1–10.
- Sport Area. (2024). Transforming volleyball passing technique learning through the STAD cooperative model. *Journal Sport Area*, 9(1), 55–64.
- St. Paul Parks and Recreation. (2025). *Passing, setting, spiking/attacking, serving: Volleyball fundamentals*.
- Stratified Fitness Group. (2025). Stratified fitness: Post COVID inequities in physical education participation and fitness. *Journal of School Health*, 95(4), 210–222.
- Sukardi, D. (2022). Physical education curriculum and its role in holistic student development. *Journal of Physical Education and Curriculum*, 4(1), 1–15.
- UNESCO. (2023). *The global state of play: Report and recommendations on quality physical education*. UNESCO.
- Vidoni, C., Araujo, R., & Hastie, P. A. (2020). Sport education and sportsmanship orientations: An intervention in physical education. *Frontiers in Psychology*, 11, 1–10.

Volleyball Strength Program. (2025). *Basic skills in volleyball: Serving, passing, setting, spiking, blocking*.

Widyanto, Z. (2024). Character education through physical education in Indonesian junior high schools. *Journal of Physical Education, Sport, Health and Recreations*, 13(1), 50–60.

Yulianto, R. (2022). Improving underhand serve ability in volleyball through the drill method. *ICE Proceedings: International Conference on Education*, 2(1), 100–108.

Zulchrif, A., & Cahyadi, R. (2023). Fostering cooperation and discipline through team sports in physical education. *Educational Science Journal*, 7(1), 25–35.