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A comprehensive instrument for evaluating advanced volleyball techniques in sport science students: design, reliability, and validity

Un instrumento integral para evaluar técnicas avanzadas de voleibol en estudiantes de ciencias del deporte: diseño, fiabilidad y validez

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Abstract. Background: The enhancement of sports performance, particularly in volleyball, relies on the use of valid and well-developed measurement tests. Numerous studies have thus developed tests tailored to different skill levels to accurately assess athletes' abilities. However, the existing instruments for measuring volleyball techniques have yet to fully address the needs of advanced levels, especially in assessing technical skills among sports science students at the advanced stage. Purpose: This study aims to develop a comprehensive volleyball skill assessment instrument for advanced-level sports students, focusing on four key techniques: serving, underhand passing, overhand passing, and spiking. The instrument underwent rigorous testing to ensure its validity and reliability, with particular attention to construct validity across different phases and indicators. Methods: The study used a development research design based on the Plomp model, involving 51 male students from the Advanced Volleyball Course at Universitas Negeri Padang. Five expert judges assessed the instrument's feasibility before implementation. The research process included preliminary research, prototyping, and assessment phases. Expert opinions were collected using a Likert scale questionnaire via the Delphi technique. Validity and reliability were analyzed using SPSS version 25, focusing on internal and external validity coefficients and Cronbach's Alpha. Results: The instrument showed high reliability, with Cronbach's Alpha values consistently above 0.87. Construct validity tests confirmed the assessment's validity, with scores indicating a strong correlation between evaluated indicators and overall skill proficiency. Conclusion: The developed instrument is a reliable and valid tool for assessing advanced volleyball skills, offering a standardized method for educators and coaches to evaluate and enhance sports science students' performance. The study highlights the importance of phase-by-phase analysis in skill assessment for more effective volleyball training programs.
Keywords: Advanced Volleyball Skill, Sports Science Student Performance, Validity and Reliability in Skill Evaluation, volleyball Technique Measurement, Developmental Research in Sports Testing

Resumen. Antecedentes: La mejora del rendimiento deportivo, particularmente en el voleibol, depende del uso de pruebas de medición válidas y bien desarrolladas. Numerosos estudios han desarrollado pruebas adaptadas a diferentes niveles de habilidad para evaluar con precisión las capacidades de los atletas. Sin embargo, los instrumentos existentes para medir las técnicas de voleibol aún no han abordado completamente las necesidades de los niveles avanzados, especialmente en la evaluación de habilidades técnicas entre los estudiantes de ciencias del deporte en etapas avanzadas. Propósito: Este estudio tiene como objetivo desarrollar un instrumento integral para la evaluación de habilidades en voleibol en estudiantes de nivel avanzado, enfocándose en cuatro técnicas clave: servicio, pase de antebrazos, pase de manos altas y remate. El instrumento se sometió a pruebas rigurosas para garantizar su validez y fiabilidad, prestando especial atención a la validez de constructo en diferentes fases e indicadores. Métodos: El estudio utilizó un diseño de investigación de desarrollo basado en el modelo de Plomp, con la participación de 51 estudiantes masculinos del Curso Avanzado de Voleibol en la Universitas Negeri Padang. Cinco jueces expertos evaluaron la viabilidad del instrumento antes de su implementación. El proceso de investigación incluyó fases de investigación preliminar, prototipado y evaluación. Las opiniones de los expertos se recopilaron utilizando un cuestionario con escala Likert mediante la técnica Delphi. La validez y fiabilidad se analizaron utilizando SPSS versión 25, enfocándose en los coeficientes de validez interna y externa y en el Alfa de Cronbach. Resultados: El instrumento mostró una alta fiabilidad, con valores de Alfa de Cronbach consistentemente superiores a 0.87. Las pruebas de validez de constructo confirmaron la validez de la evaluación, con puntuaciones que indican una fuerte correlación entre los indicadores evaluados y la competencia general en habilidades. Conclusión: El instrumento desarrollado es una herramienta fiable y válida para evaluar habilidades avanzadas en voleibol, ofreciendo un método estandarizado para que educadores y entrenadores evalúen y mejoren el rendimiento de los estudiantes de ciencias del deporte. El estudio destaca la importancia del análisis fase por fase en la evaluación de habilidades para programas de entrenamiento en voleibol más efectivos.
Palabras clave: Evaluación de Habilidades Avanzadas en Voleibol, Rendimiento de Estudiantes de Ciencias del Deporte, Validez y Fiabilidad en la Evaluación de Habilidades, Medición de Técnicas de Voleibol, Investigación de Desarrollo en Pruebas Deportivas.

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Introduction

The assessment of sports skills has always been a crucial element in the development of athletes, especially in competitive environments where precise evaluation is necessary to enhance performance (Bompa & Carrera, 2015; Dimyati et al., 2023; Ibrahim et al., 2020; Ilham & Tomoliyus, 2021; Muslimin et al., 2020). Volleyball, a sport that demands a combination of technical skill, strategic understanding, and physical prowess, requires reliable and valid assessment tools

to measure and develop players' competencies(Paz et al., 2017; Popovych et al., 2022; Muhamad S. Rifki et al., 2022). Developing skill test instruments tailored to advanced-level sports students is essential to ensure that these assessments accurately reflect the players' abilities and potential for improvement.

Skill assessment in volleyball serves several critical functions, including talent identification, training program customization, and performance monitoring. Precise assessment tools allow coaches to identify specific areas where players excel or need improvement, which is crucial for tailoring training programs to individual needs (Irawan et al., 2024). This is particularly important for advanced-level sports students who are on the cusp of transitioning to professional levels, where the margins of error are minimal, and the demands for precision are high (Zapolska et al., 2014).

Volleyball integrates multiple skills, such as serving, passing, setting, attacking, blocking, and defending (Clarsen et al., 2013; Ihsan et al., 2023; Marinho & das Virgens Chagas, 2022; Ortega-Toro et al., 2019; Risma et al., 2024). Each of these skills involves a complex interaction of biomechanical, psychological, and tactical elements (Gil-Arias et al., 2021; Wallace & Knudson, 2020). As such, a one-size-fits-all approach to skill assessment is inadequate. Instead, as suggested by (Fellingham, 2022) here is a need for specialized instruments that can dissect these skills into measurable components, providing a granular understanding of a player's strengths and weaknesses.

Several studies have highlighted the importance of developing specialized assessment tools to effectively measure specific volleyball skills (Fauzi, 2011; Ilham et al., 2024). For instance, Rifki et al. (2022) focusing on improving the reliability and precision of volleyball skill assessment tools through the creation of a new test instrument model. Moreover, ensuring the validity and reliability of these assessment tools is crucial for obtaining accurate data from skill evaluations.Research by Jariono (2023) highlighted the importance of robust validity and reliability levels in test data to accurately measure volleyball playing skills.. Additionally, Fauzi (2024) highlighted that the validity of an assessment instrument significantly affects the confidence in the data it generates, emphasizing the need for reliable tools in skill evaluation. Technology advancements have also impacted the development of innovative volleyball skill test instruments. Komaini et al. (2022) explored the design of a volleyball smash test instrument utilizing sensor technology, reflecting the growing application of sensors in sports science for precise measurements.

Developing a volleyball skill test instrument for advanced-level sports students requires a comprehensive approach that addresses the specific skills essential for volleyball performance. Sports science students specializing in volleyball need adaptable testing tools that can be utilized in various settings to assist them in achieving certification or passing their examinations.

By focusing on validity, reliability, and incorporating technological advancements, researchers and educators can develop effective assessment tools that accurately measure and enhance the volleyball skills of advanced students.

This article aims to develop a volleyball skill test instrument specifically designed to evaluate techniques such as lower passing, upper passing, spiking, and overhand serving.

Materials and Methods

Study design

This study employs a developmental research design based on the framework proposed by Plomp and Nieveen (Plomp & Nieveen, 2013). The focus of the study is on creating a comprehensive volleyball skill test by refining existing indicators for lower passing, upper passing, spiking, and serving. The objective is to develop a test that meets the demands of advanced-level coursework and to assess its validity and reliability.

Participant

The study was conducted with students enrolled in the Advanced Volleyball Course during the January-June 2024 semester, comprising a total of 247 participants (204 males and 43 females). Purposive sampling was used based on specific criteria, including age range (17-22 years) and gender (male). A final sample of 51 sports science students consented to participate. Additionally, the study involved five experts: one professor specializing in sports education and performance coaching, one professor in sports testing and measurement, two national-level coaches who are certified volleyball instructors at the Faculty of Sports Science, and one international volleyball coach.

Procedures and data collecting

The study followed a three-phase procedure: preliminary research, prototyping, and assessment (Plomp & Nieveen, 2013).

- Preliminary Research Phase: This phase involved analyzing the needs and context for product design, including volleyball curriculum requirements, semester lesson plans, and product material analysis.
- Prototyping Phase: During this phase, the product was designed as a series of tests covering the preparation, execution, and final stages of four technical skills: serving, lower passing, upper passing, and spiking. The prototype was then evaluated by experts using a Likert scale questionnaire (1-4) and detailed feedback, with data collected through the Delphi technique (Hsu & Sandford, 2007).

- Assessment Phase: The final phase involved implementing the tests to obtain external validity, ensuring the reliability and accuracy of the developed instrument.

Statistical analysis

Descriptive statistical analysis and construct validity testing were conducted by analyzing the average scores from five expert evaluations. Differences in mean scores among experts were examined. Item difficulty was assessed using chi-square analysis of pass rates for each item. Internal validity was measured by item-total correlation (ITC) using Pearson's product-moment correlation coefficient, with an ITC value of ≥ 0.15 deemed acceptable (Varma, 2006). Internal reliability was assessed using Cronbach's alpha(Cronbach, 1951), with a value of 0.6 to 0.7 indicating acceptable internal consistency, 0.7 to 0.9 indicating good internal consistency, and > 0.90 indicating excellent internal consistency (George, D., & Mallery et al., 2003).

To standardize the instrument, the following tests were conducted:

1. Validity Test: Assesses whether the instrument measures what it is intended to measure.
2. Reliability Test: Evaluates the consistency and trustworthiness of the instrument.
3. Practicality Test: Examines the practicality and usability of the instrument.
4. Effectiveness Test: Measures the efficiency of the instrument in practical application (Cury et al., 2019; Kane, 2013).

All data were analyzed using IBM SPSS software version 25, with significance determined at $p < 0.05$.

Result

Product description

The product of this research is an instrument designed to assess advanced-level volleyball skills among sports science students. This instrument features technical test formats with target areas organized into three phases: preparation, execution, and finalization. Detailed descriptions of the developed tests for serving lower passing, upper passing, and spiking are illustrated in Figures 1-3.

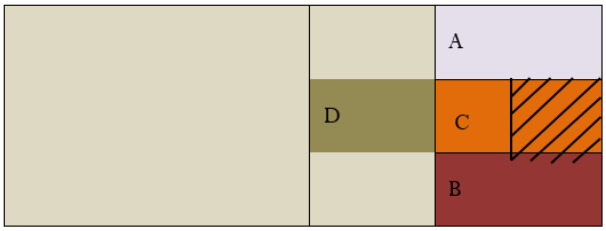

Figure 1. Implementation of the Service Test Instrument
Description:
A = Service area with scoring 2 points
B = Service area with scoring 2 points
C = Service area with scoring 3 points
D = Service area with scoring 1 point

Test Procedure:

1. The service is performed within the designated service area according to official volleyball rules.
2. Each participant completes 10 service attempts.
3. A ball that lands in target area C earn 3 points.
4. A ball that lands in target areas A or B earns 2 points, and a ball landing in area D earns 1 point.
5. The final score is the total sum of points from all 10 service attempts that successfully land in the target areas.

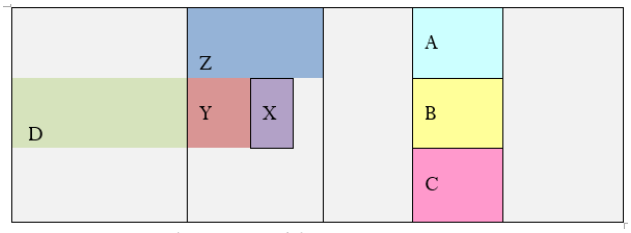

Figure 2. Implementation of the Lower Passing Test Instrument
Description:
A, B and C = Locations where the test taker performs the passing test
X = Target area with scoring 3 points
Y = Target area with scoring 2 points
Z = Target area with scoring 1 point
D = Area where the ball is tossed by the feeder

Test Procedure:

1. The test taker performs the passing test 10 times: 3 attempts in area **A**, 4 attempts in area **B**, and 3 attempts in area **C**.
2. The feeder stands in area D and tosses the ball toward the test taker as accurately as possible.
3. The quality of the toss is assessed by the test taker.
4. A ball passed into target area X earns 3 points.
5. A ball passed into target area Y earns 2 points.
6. A ball passed into target area Z earns 1 point.

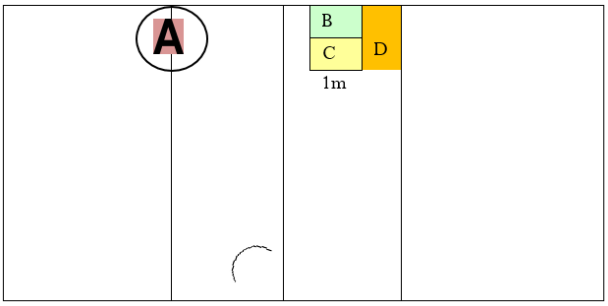

Figure 3. Implementation of the Upper Passing Test Instrument
Description:
A = Area where the test taker performs the test.
B = Target area scoring 3 points
C = Target area scoring 2 points
D = Target area scoring 1 point

Test Procedure:

The feeder is positioned in a semi-circular area and is responsible for tossing the ball as accurately as possible toward the test taker.

1. The test taker assesses the quality of the toss and adjusts their performance accordingly.
2. A ball passed into target area B earns 3 points.
3. A ball passed into target area C earns 2 points.
4. A ball passed into target area D earns 1 point.

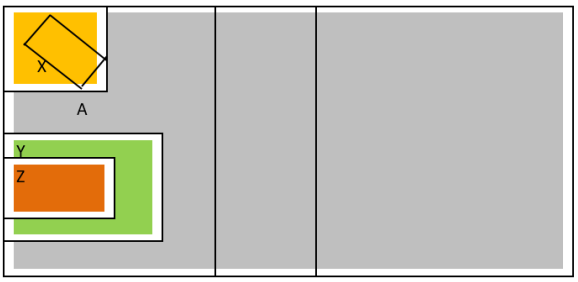

Figure 4. Implementation of the Smash Test Instrument
Description:

X = Smash target area measuring 1 x 2 meters, scoring 3 points.
Z = Smash target area measuring 1 x 2 meters, scoring 2 points.
Y = Smash target area with a score of 2 points.
A = Smash target area with a score of 1 point.

Test Procedure:

1. The smash is performed from position IV.
2. The test taker performs a total of 10 smashes.
3. Five smashes are aimed at area Z and five smashes are aimed at area X.
4. A smash that lands in target area X earns 3 points.
5. A smash that lands in target area Z earns 3 points.
6. A smash that lands in target area Y earns 2 points.
7. A smash that lands in target area A earns 1 point.

Validity and reliability

This study also reports the results of validity and reliability tests for various techniques (serving, lower passing, upper passing, and spiking) and phases (preparation, execution, and finalization) using the evaluation indicators designed for the volleyball skill instrument.

For the serving technique, the preparation phase yielded a validity coefficient of 0.548 and a Cronbach's Alpha reliability score of 0.923.

The execution phase produced a validity coefficient of 0.572 and a reliability score of 0.967, while the final phase showed a validity coefficient of 0.526 and a reliability score of 0.932. All phases are categorized as excellent, as detailed in Table 1.

Table 1.
Validity and Reliability Distribution for the Volleyball Service Instrument.

Service	Target	Mean ± SD	Validity α=0,05	Reliability
Preparation Phase	Stand with your left foot slightly ahead of your right foot, with your weight on your left foot,	80 ± 0,34	0,548	0,923
	Hold the ball with your left hand,	79 ± 0,10		
	Position your right hand beside and above your head, ready to strike, and	80 ± 0,35		
	Slightly arch your upper body backward, with your right elbow slightly bent.	75 ± 0,28		
Execution Phase	Toss the ball upward about half a meter from your hand,	78 ± 0,34	0,572	0,967
	After the ball is tossed upward, immediately strike the centre back of the ball with your right hand, using a cupped palm,	80 ± 0,17		
	When striking, snap your hand and keep your wrist firmly locked to prevent movement,	79 ± 0,46		
	At the moment of contact, the straighter your striking arm, the higher the ball will travel relative to the court surface, making it more difficult for the opponent to receive the ball.	80 ± 0,45		
Final Phase	After striking the ball, the hand should be held steady, with no movement allowed in the wrist,	75 ± 0,10	0,526	0,932
	The athlete's hand movement during the service should not follow the trajectory of the ball,	80 ± 0,20		
	The athlete's strike during the service should avoid creating a torque effect on the ball, ensuring that the hand follows the force generated by the strike.	77 ± 0,10		
	After striking the ball, step forward.	80 ± 0,10		

Here (Figure 5) is the graphical representation of the Mean ± SD, Validity, and Reliability across the different phases of the Service Test. The blue line represents the Mean ± SD, while the red and green lines represent Validity and Reliability, respectively.

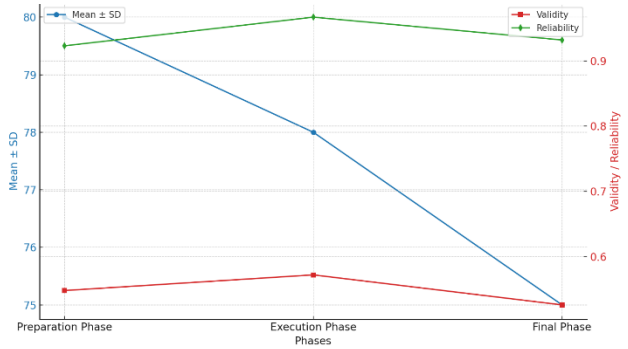

Figure 5. Graphical Representation of mean, validity, and reliability for service across phases

In the lower passing technique, the preparation phase achieved a validity score of 0.554 and a Cronbach's Alpha reliability score of 0.873. The execution phase produced a validity score of 0.537 and a reliability score of 0.918, while the final phase showed a validity score of 0.548 and a reliability score of 0.952. All phases are categorized as excellent, as detailed in Table 2.

Table 2.
Distribution of Validity and Reliability for the Volleyball Lower Passing Instrument.

Target		Mean ± SD	Validity	Reliability
Lower Passing				
Preparation Phase	Both knees are bent, and the body is leaned forward,	76 ± 0,32	0,554	0,873
	positioned as the lead foot in front,	80 ± 0,24		
	Both hands are clasped together, with the back of the right hand placed on top of the left palm, thumbs aligned and even in length	75 ± 0,10		
	Both arms are held parallel, forming a platform, with elbows locked, arms aligned with the thighs, and the waist straight.	78 ± 0,18		
Execution Phase	Swing both arms toward the ball, using the shoulder joints as the axis of movement	76 ± 0,35	0,537	0,918
	The elbows must remain fully straight, without bending.	80 ± 0,40		
	The knees follow through, and the legs are straightened.	78 ± 0,32		
	The ball makes contact with the proximal part of the arms, above the wrists, when the arms form an angle of approximately 45 degrees.	80 ± 0,34		
Final Phase	Keep the fingers clasped together.,	75 ± 0,43	0,548	0,952
	The elbows remain locked,	78 ± 0,10		
	The platform follows the ball toward the target.	80 ± 0,25		
	Focus on the ball as it moves toward the target.	80 ± 0,38		

Here (Figure 6) is the graphical representation of the Mean ± SD, Validity, and Reliability across the different phases of the Lower Passing Test. The blue line represents the Mean ± SD, while the red and green lines represent Validity and Reliability, respectively.

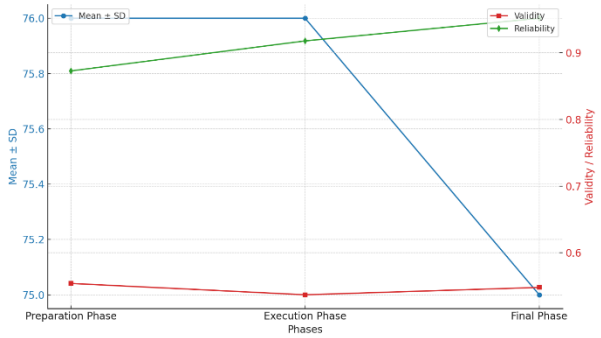

Figure 6. Graphical Representation of mean, validity, and reliability for lower passing across phases

In the upper passing technique, the preparation phase yielded a validity score of 0.493 and a Cronbach's Alpha reliability score of 0.873. The execution phase produced a validity score of 0.587 and a reliability score of 0.872, while the final phase showed a validity score of 0.546 and a reliability score of 0.968. All phases are categorized as excellent, as detailed in Table 3.

Table 3.
Validity and Reliability Distribution for the Volleyball Upper Passing Instrument.

Target		Mean ± SD	Validity	Reliability
Upper Passing				
Preparation phase	Stand with your feet shoulder-width apart, with one foot slightly forward,	80 ± 0,56	0,493	0,957
	Both knees are bent,	75 ± 0,32		
	osition your arms in front of your face, with elbows bent and both palms facing forward,	80 ± 0,38		
	Fingers are spread open, forming a triangle in front of and above your face.	76 ± 0,10		
Execution Phase	Move towards the incoming ball, avoiding passing from the side of the body,	79 ± 0,16	0,587	0,872
	Receive the ball with both hands, with your elbows slightly bent,	80 ± 0,34		

	The contact should primarily be with the base of the thumbs, index fingers, and middle fingers, which are slightly cupped,	75 ± 0,52		
	When touching the ball, the fingers should be flexible and strong, pushing with the wrist while extending the elbows and knees.	80 ± 0,46		
	Push your arms for the upper pass, starting from the fingers, then the hands, and finally the elbows,	77 ± 0,25		
Final Phase	Heels lift off the ground,	80 ± 0,43	0,546	0,968
	Hips and knees rise, and both arms straighten. If necessary, follow through by stepping forward with the foot as a continuation of the movement	80 ± 0,34		
	Your gaze follows the direction of the ball's movement.	79 ± 0,43		

Here (Figure 7) is the graphical representation of the Mean ± SD, Validity, and Reliability across the different phases of the Upper Passing Test. The blue line represents the Mean ± SD, while the red and green lines represent Validity and Reliability, respectively.

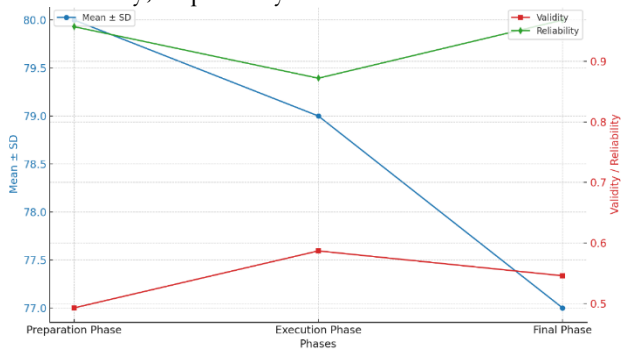

Figure 7. Graphical Representation of mean, validity, and reliability for upper passing across phases

In the Smash Instrument, the preparation phase yielded a validity score of 0.527 and a Cronbach's Alpha reliability score of 0.892. The execution phase resulted in a validity score of 0.483 and a reliability score of 0.965, while the final phase produced a validity score of 0.586 and a reliability score of 0.963. All phases are categorized as excellent, as detailed in Table 4.

Table 4.
Validity and Reliability Distribution for the Volleyball Smash Instrument.

Smash	Target	Mean ± SD	Validity	Reliability
Preparation Phase	Stand relaxed, with both hands hanging at your sides, body leaning forward. Shift your weight from one foot to the other, preparing to step forward,	78 ± 0,43	0,527	0,892
	Take short steps forward, with the final step being the longest,	80 ± 0,34		
	The second-to-last step is used to adjust the distance between the smasher and the ball to ensure proper reach, while the final step remains long,	75 ± 0,10		
	The final step before the long jump should leave both hands behind, ready to swing during the jump, ensuring that the momentum from the approach is maintained.	80 ± 0,23		
Execution Phase	From the long step, with both hands left behind, swing your hands forward and upward,	79 ± 0,56	0,483	0,965
	Follow with your back foot to the side of your other foot, then straighten your knees and jump.	80 ± 0,43		
	Both hands swing upward to lift your body, with the right hand positioned to strike the ball.,	77 ± 0,12		
	Strike the ball at the peak of your reach, keeping your elbow straight and your wrist active.	80 ± 0,62		
	Land on both feet with a soft, spring-like motion.	79 ± 0,23		
Final Phase	Regain your balance quickly to be ready to retrieve the ball if it is blocked.	78 ± 0,10	0,586	0,963
	Return to a ready position to either block or perform another smash.	80 ± 0,52		
	Keep your gaze focused on the direction of the ball's movement.	80 ± 0,34		

Here (Figure 8) is the graphical representation of the Mean ± SD, Validity, and Reliability across the different phases of the Smash Test. The blue line represents the Mean ± SD, while the red and green lines represent Validity and Reliability, respectively

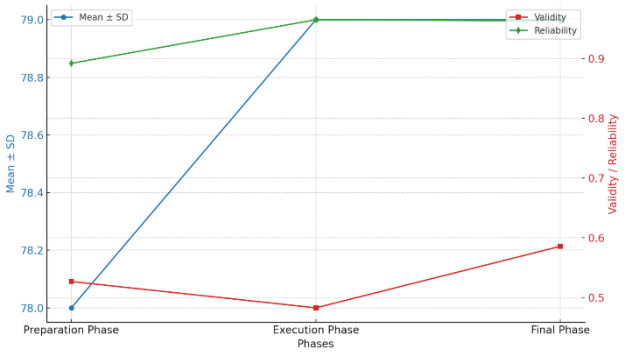

Figure 8. Graphical Representation of mean, validity, and reliability for smash across phases

Discussion

Based on the literature review, while extensive research has been conducted on volleyball performance, there remains a limited number of technical skill instruments specifically designed for advanced-level sports science students in volleyball training (Muhamad Sazeli Rifki et al., 2022; Risma et al., 2024; Shan et al., 2015). The results of this study demonstrate that all items of the developed volleyball skill tests—serving, lower passing, upper passing, and smashing—are both valid and reliable, with high ratings. Consequently, these tests are well-suited for accurately measuring the technical volleyball skills of advanced-level sports science students.

The development of a volleyball skill test instrument tailored for advanced-level sports students represents a significant contribution to the field of sports science, particularly in evaluating students' technical abilities. This instrument is meticulously designed to assess critical volleyball skills, including serving, lower passing, upper passing, and smashing. It includes structured test phases—preparation, execution, and finalization—each validated and tested for reliability, ensuring the instrument's robustness and applicability in academic settings.

The design allows for a comprehensive evaluation of each student's abilities (Ilham & Tomoliyus, 2021; Sukarmin et al., 2021). The high validity and reliability scores obtained across all tests confirm that this instrument is both robust and precise, making it a valuable resource for educators and coaches. It not only provides a standardized method for evaluating volleyball skills but also contributes to enhancing the training and development of advanced-level volleyball players.

The research findings indicate that the instrument is both valid and reliable across all test phases. For the service test, the preparation phase achieved a Cronbach's Alpha of 0.548 for validity and 0.923 for reliability, indicating a high level of consistency. The execution phase exhibited even stronger reliability, with a Cronbach's Alpha of 0.967, underscoring the test's robustness. The finalization phase also demonstrated strong reliability, ensuring effective evaluation of the student's ability to conclude the service.

Similar trends were observed in the lower passing test, where all phases showed high reliability and validity, confirming the test's effectiveness. The upper passing test also showed strong reliability ~~scores~~, particularly in the execution and finalization phases, indicating its suitability for measuring overhead passing skills. The smash test, while slightly lower in validity during the preparation phase, still demonstrated high reliability across all phases. The finalization phase of the smash test showed particularly strong reliability with a Cronbach's Alpha of 0.963, ensuring accurate measurement of the student's ability to complete the smash.

Previous research highlights the importance of developing volleyball instruments for various specific purposes, such as measuring accuracy or evaluation (López et al., 2023; Muhamad Sazeli Rifki et al., 2022). Implementing skill-based tests in volleyball training programs has been shown to improve accuracy and technique, particularly in spiking and passing, underscoring the value of such instruments for tracking and enhancing volleyball skill development (Gabbett et al., 2006). Volleyball-specific skills tests that measure technical aspects like accuracy and technique can successfully discriminate between players of different competitive levels, illustrating the importance of skill testing in identifying and nurturing advanced-level talent (Formenti et al., 2022).

The study's limitations include the omission of physiological and psychological factors, such as anxiety levels and physical condition, which were not analyzed despite their significant impact. Additionally, the generalization is currently limited to male participants. Future research should address further specifications, such as age, gender, and the inclusion of preliminary questionnaires on factors like athletic experience.

The volleyball skill test instrument developed through this research is a comprehensive tool designed to measure specific volleyball skills among advanced-level sports science students. It is divided into four primary sections: serving, lower passing, upper passing, and smashing, each broken down into three phases—preparation, execution, and finalization—allowing for a detailed assessment of student performance at each stage.

Conclusion

The volleyball skill test developed for advanced-level sports science students has been demonstrated to be highly valid and reliable. As all components of the test exhibit strong validity and reliability, it is concluded that this instrument is well-suited for comprehensive assessment of the skills of sports science students enrolled in advanced volleyball courses.

Thus, this test can be effectively utilized to evaluate and enhance the technical proficiency of these advanced-level athletes.

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