

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

Asmiati¹, Eka Novita Indra²

^{1,2}Departement of Sport Science, Faculty of Sport and Health Sciences, Yogyakarta State University, Yogyakarta, Indonesia

ABSTRACT: This research aims to: (1) produce a hanging ball smash training medium that meets the needs of Rokania University Volleyball Club players; (2) test the feasibility of the hanging ball based on expert assessment; and (3) prove the effectiveness of the hanging ball in improving the smash.

This research was a research and development study ADDIE model, which included the stages of analysis, design, development, implementation, and evaluation. The research was conducted at Rokania University Volleyball Club. The small-group trial subjects numbered 20 players, while the field test subjects numbered 50 players. The product validation was conducted by 3 subject matter experts and 1 media expert. The data were collected through observation, interviews, questionnaires, and a smash accuracy test. The content validity of the product assessment instrument was analysed by using the Item-Level Content Validity Index (I-CVI) and Scale-Level Content Validity Index/Average (S-CVI/Ave), and reliability was assessed using Cronbach's Alpha. Product feasibility data were analysed descriptively and quantitatively. Product effectiveness was assessed by using the Shapiro–Wilk normality test, the Paired Samples t-test in the small group test, and the Wilcoxon Signed Rank Test.

The research findings reveal that product, a hanging ball smash training tool, is equipped with a support frame, ball holder, height adjuster, transfer wheels, safety parts, user instructions, and standard operating. The tool receives an average score of 3.77, categorized as very suitable. The assessment instrument is to have excellent content validity and an S-CVI/Ave value of 1.00 and reliability with a Cronbach's Alpha value of 0.823. In the small group test, the average smash accuracy score increases from 89.10 to 111.10, representing a 24.69% increase, with a significance value of 0.000. In the field test representing a 21.15% increase, with a significance value of 0.000. Thus, hanging ball smash training tool is highly suitable for improving the smash accuracy of Rokania University volleyball players.

KEYWORDS: Hanging ball, smash accuracy, training tool, volleyball smash

I. INTRODUCTION

According to Law of the Republic of Indonesia Number 11 of 2022 concerning Sports Chapter I General Provisions Article 1 of this Law, what is meant by: Sport is all activities that involve the mind, body, and soul in an integrated and systematic manner to encourage, foster, and develop physical, spiritual, social, and cultural potential. Sport is any aspect related to Sports that requires regulation, education, training, coaching, development, improvement, supervision, and evaluation. National Sports is a sport based on Pancasila and the 1945 Constitution of the Republic of Indonesia which is rooted in sports values, Indonesian national culture, and responsiveness to the demands of sports development. Sport is an inseparable part of human life (Gazali, 2016). In Indonesia, volleyball has been known for a long time, introduced by the Dutch during the colonial period. Along with its development, volleyball at this time as football and basketball, always brings a lively atmosphere and more enthusiasm when playing it or just to enjoy the game. Each game provides its own attraction for both the players and the audience (Tawakal, 2020).

Volleyball is a sport played by two teams on a single court separated by a net. Each team consists of six (6) players. The number of players in this volleyball sport has different versions, the type or size of the court, the winning numbers used, for certain purposes. However, in reality, volleyball is meant to disseminate playing skills to everyone who is interested in it (Iswayudi, Nanda, 2017). Volleyball in Indonesia has been known since 1982 by a Dutch company, volleyball in Indonesia is regulated by the parent organization, PBVSI (Indonesian Volleyball Association) by the Indonesian Olympic Committee in 1955. This volleyball has been developed in the national and international arena, the achievements of this sport have been competed from the regional level to the national level according to tawakal ikbal (2020).

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

One of the most important techniques in volleyball is the act of hitting the ball down with full power, by jumping up as high as high so that the ball can swoop down and cannot be taken by the opponent, thus getting points or points. The Smes technique is the most difficult technique and has complex movements so that the smes technique must be trained to the volleyball team so that it can apply the Smes technique that will add the desired results or points (Pranopik, 2017). Smes is one of the basic techniques in volleyball which is carried out as an effort to get as many points as possible. Hard ball punches are usually able to kill the opponent's defense because the ball is difficult to receive or return by the opponent (Nurfalah & Satya Karnawijaya, 2019).

The low motivation of athletes in volleyball games such as interest in volleyball is very lacking, the level of understanding in the use of hanging ball training media is still lacking, the adjustment of the height of the hanging ball is not appropriate when doing smes accuracy, so it requires training media for smes accuracy in volleyball. With the training media that is prepared, it can support the motivation and enthusiasm of athletes in playing volleyball, so that the understanding of basic smes techniques to produce smes accuracy can be improved. To improve Smes technique, a hanging ball training medium was formed to improve the accuracy of Smes in volleyball. With repeated practice, it can make volleyball athletes accustomed and build motivation in using hanging ball media in volleyball games. The application of hanging ball training media can increase athletes' motivation based on several things that can certainly trigger students such as, exercises that are carried out according to the techniques they master are not monotonous, athletes can gain new experience in playing volleyball, with precision smes training that is carried out continuously can attract the attention of athletes and increase smes in volleyball practice.

Based on this problem, the first step in this research is the importance of how to develop a proper and effective hanging ball training media to improve the accuracy of smes in volleyball club players?

II. METHODS

This research is included in the type of research and development or Research and Development. According to Sugiyono (2009:297), research and development is research that produces a certain product and tests the effectiveness of the product. According to Sugiyono (2017:297) Research and Development is a research method aimed at producing certain products. According to Sugiono (2019), the research and development method (Research and Development) is one type of research method. Research methods in general can be interpreted as a scientific way to obtain data with specific purposes and uses. The development research used consists of five stages which are stated The ADDIE Model consists of five stages, including Analysis, Design, Development, Implementation and Evaluation according to Branch (2009) this development research uses the ADDIE development model to produce a hanging ball training media that is designed in stages. This media development research is carried out with steps according to the steps in the ADDIE development model.

The reason the researcher chose the ADDIE development method is because this development model has advantages in its systematic work stages. Each phase is evaluated and revised from the stages that have been passed, so that the resulting product becomes a valid product. In addition, the ADDIE model is very simple, but the implementation is systematic. The ADDIE model is a media planning model that provides an organized process in the development of a hangball training media.

There are five steps proposed in this model according to the acronym, namely:

Analysis

This stage focuses on the analysis of needs in the practice of hanging ball. The goal is to identify the problems that arise and determine the right solutions, including strategies to improve the accuracy of volleyball smes.

Design

At this stage, the training media is designed in such a way that it suits the needs of the training and is able to support the achievement of the goals that have been set.

Development

The implementation stage is the application of training media in direct volleyball practice. Players use the media to practice the accuracy of smes in a repetitive and structured manner.

Evaluation

The final stage is evaluation, where the effectiveness of the exercise media is assessed. The results of this evaluation are a reference to find out the extent to which the media is able to improve the accuracy of smes and the ability to play volleyball as a whole.

Based on the results of the description above, it can be concluded that the ADDIE method is a simple series that can produce a hanging ball training medium so that the process can be applied in various settings due to its general structure. This can be seen in the steps of ADDIE that have gone through a process of improvement or revision so that interesting training media products can be obtained that will create accurate effective Smes results. The following is a picture of media development using the ADDIE model



Figure 1. ADDIE Development Model Chart According to Branch (2009)

The model used in the development of hanging ball training media is using the ADDIE model To develop a good training medium in the sense of being able to improve the quality of training, good planning is needed. In compiling the design of training media, both regarding the material (content), pedagogics, appearance and language aspects and the goals to be achieved with the training media. The hanging ball training media that will be developed using the ADDIE model consists of 5 stages, namely:

Analisis (analysis)

In the initial stage, first conduct observations and interviews in the field to obtain information related to hanging ball training media for analysis. The results of the analysis are known that the level of accuracy of Smes of Rokania university club players is still lacking.

Desain (design)

After the analysis stage is carried out, the next step is to carry out the planning stage of the design of the hanging ball media which will be made to be used as training material at this stage in the form of frameworks before developing the product, the framework in question is the hanging ball media. The following is an example of a hanging ball media according to Raditia et.al., 20221, namely



Figure 2. Hanging ball media according to (Raditia et al., 2021)

Scarlet Witch Hunt (Development)

The development of this hanging ball media will be modified as simply as possible from the previous one and can be used anywhere, it can be brought when practicing both on campus and in places where there are no friends to play, can be used for the use of the tool for the precision training of the Smash. In the development stage, this researcher can collect materials that can support in developing hangball training media.

Implementasion

At this stage, after the product is validated by validation experts, then implement the product developed in small groups. At this stage, only small groups are implemented because they are in accordance with the existing sample situation, which is as many as 20 samples.

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

Evaluation

At this stage, evaluation is carried out with the development progressing, so that shortcomings during the development process can be identified and resolved properly.

A. Data, Instruments, and Data Collection Techniques

Instruments In this study, the data collection technique is used, namely by using questionnaires. This data collection technique and questionnaire are the details of questions that will be addressed to respondents in the field that will be prepared by the researcher. According to Arikunto (2016:101), a questionnaire is a collection of questions that are asked in writing to a person to be asked for the results after filling out the questionnaire. The type of questionnaire that will be given later is in the form of multiple choice or it can also be an essay, the respondent only chooses the one that they feel is suitable for what they think.

Instumen ketepatan smeh menurut Narlan, Abdul, Junar Dicky Tri tahun 2020. tes ketepatan smes yaitu:

Purpose

The purpose of this test is to find out or measure the skill of performing smes or attacks in a targeted and fast manner.

Equipment used

Volleyball court

Net and net pole

Volleyball 5 pieces

Stopwatch

Test formular and pens

Officers

1 recorder

1 person stopwatch holder

1 score or target observer

Implementation

The field assistant creates a goal score on the field area with the size shown in the picture.

Athletes stand free behind the attacking area.

When ready, the ball is thrown by the field assistant into the area near the net. The athlete then tries to grab the ball and hit it as hard as possible through the net, with the direction of the shot directed to fall on the opponent's area that has been designated as a target and has been scored.

The stopwatch is run when the ball is touched by the athlete's or student's hand and stopped when the ball hits the floor or field.

Athletes or students are given the opportunity to do the test 5 times.

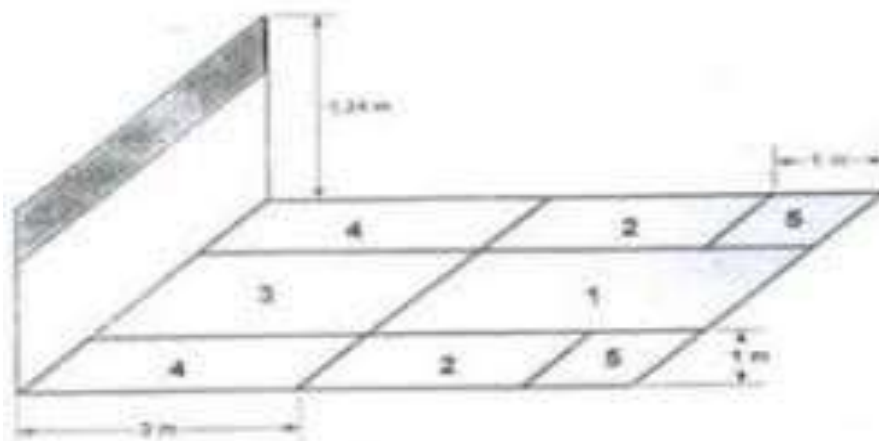


Figure 3. Volleyball Smes Tests

Rating

The score taken is the speed of the ball falling and the target number. with the following criteria:

The speed at which the ball falls is recorded in seconds to tenths.

The ball that touches the target boundary, the largest number is taken

It is not scored when an athlete or student touches the net, or the ball falls off the goal (but the speed of the ball is still counted).

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

Calculating the overall score in the Smes test is by combining speed and score, using the T-Score formula below.

T-score= $50 + 10 \times \frac{x - S}{S}$ (for normal)

T-score = $50 + 10 \times \frac{x - S}{S}$ (for time)

Description :

T-score : The standard score sought

T-score : Score obtained

x: Average value

S : Standard deviation

B. Data Collection Techniques

The data from this research is in the form of responses of media experts and the Rokania University club to the feasibility of the product media that has been developed from the aspect of ease of using media, the benefits of the media made, and the effectiveness of the tools made.

Data can be in the form of comments, suggestions for improvement, and the results of the researcher's observations during the trial process are analyzed descriptively and concluded as input to improve or revise the product that has been developed. Meanwhile, the responses of material experts and students in the form of score data obtained through questionnaires were analyzed descriptively quantitatively with percentage and categorization techniques. The data obtained is converted into interval data.

III. RESULT

The results of the product test in this study aim to determine the feasibility, readability, validity, reliability, and initial suitability of the hanging ball smes training media before being used at the field test stage. Product testing is carried out in stages, namely expert validation, instrument readability test, grain validity test, instrument reliability test, and small group test.

The product tested in this study is in the form of a hanging ball smes training media developed to improve the accuracy of smes in volleyball club players of Rokania University. This media is assessed based on aspects of suitability with the purpose of the training, safety of use, ease of use, practicality of the media, suitability with the characteristics of SMES techniques, and the benefits of media in improving SMES accuracy.

The measurement of the accuracy of the smes is carried out based on the target score and the time of the smes. The target score or X value refers to the target area of the field that has a value of 1 to 5. Each student conducted three experiments during the pretest and three experiments during the posttest. The best score is taken from the highest X score. If there is the same X score, then the experiment with the fastest smes time is selected. The final score is obtained from the combined value of T-X and T-Time. The formula used to obtain a standard score is as follows.

$$T_X = 50 + 10 \times \frac{X - M_X}{SD_X}$$
$$T_W = 50 + 10 \times \frac{M_W - W}{SD_W}$$
$$Total\ Skor = T_X + T_W$$

Description:

T_X	=	Target accuracy standard score.
T_W	=	SMES time standard score.
X	=	Best Goal Score.
W	=	best SME time.
M_X	=	average target score.
M_W	=	Average SME time.
SD_X	=	standard deviation of the target score.
SD_W	=	standard deviation of SMES time.

The validation instrument uses a four-scale questionnaire. A score of 4 was given for the Very Appropriate (SS) category, a score of 3 for Appropriate (S), a score of 2 for Less Appropriate (KS), and a score of 1 for Not Appropriate (TS). Media eligibility criteria are determined based on the average score interval.

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

Table 1. Media Validation Questionnaire Assessment Criteria

No	Answer Options	Singkatan	Shoes
1	Highly Appropriate	SS	4
2	Conform	S	3
3	Less Suitable	KS	2
4	Inappropriate	TS	1

Table 2. Media Eligibility Criteria

No	Score Interval	Eligibility Categories
1	3,26 – 4,00	Highly Worth It
2	2,51 – 3,25	Worthy
3	1,76 – 2,50	Less Worthy

The first material expert, Yanto, gave an average score of 4.00 with a very decent category. The results of the assessment show that the hangball smes training media is in accordance with the needs of volleyball smes technique training. This media is considered to be able to help players perform precision exercises in a more targeted manner because the ball position can be made more stable and can be adjusted to the player's range.

The second subject expert, namely Rabbi Gusti Ulya, S.Pd., gave an average score of 4.00 with a very decent category. The validator assessed that the media of hanging ball smes training can help players in understanding the contact point between the palm and the ball. In addition, this medium is also considered practical because it can be used for independent training without always relying on a tosser.

The third material expert, Dr. Atikah Rahayu, M.Ph., gave an average score of 3.50 with a very decent category. Although the media was declared to be very decent, the validator provides input so that the product is equipped with Standard Operating Procedures (SOPs), adjustment of media sizes with the characteristics of the manufacturer, and technical instructions for the use of media.

Media expert, namely Ferri Hendryanto, S.Pd., M.Pd., gave an average score of 3.56 with a very decent category. The results of the assessment show that the suspended ball training media developed has met the feasibility criteria in terms of design, appearance, practicality, safety, and ease of use. In terms of design, the media is considered to have a fairly proportional shape and in accordance with the needs of volleyball smes training. The media structure is also considered to be able to support the implementation of training because it can help players make smes shots with a more stable and directed ball position.

In addition, media experts consider that the hanging ball smes training media is quite practical to use in the training process. The media can be moved as needed as it has supporting parts that make it easy to use in the field. This media is also considered to be able to be used in various training conditions, both indoors and outdoors, as long as it still pays attention to the safety of the training area. From the safety aspect, the media is considered quite feasible to use because the design of the tool has paid attention to the stability and comfort of the player when performing smes movements.

However, media experts provide several suggestions for improvement so that the use of media becomes more optimal. One of the suggestions given is the need for instructions for using media that are more communicative and easy to understand by users. Instructions for use should not only be presented in written form, but should also be accompanied by pictures or illustrations of the steps for use. This aims to enable players and coaches to understand how to manage the media, determine the position of the ball, adjust the height of the tool, and use the media according to training procedures more clearly.

Table 3. Recapitulation of Expert Assessment Results

No	Validator	Rerata	Category	Remarks
1	Material Expert 1: Yanto	4,00	Highly Worth It	No revisions
2	Material Expert 2: Rabbi Gusti Ulya, S.Pd.	4,00	Highly Worth It	No revisions
3	Material Expert 3: Dr. Atikah Rahayu, M.Ph.	3,50	Highly Worth It	Revisi minor
4	Material Expert: Ferri Hendryanto, S.Pd., M.Pd.	3,56	Highly Worth It	Revisi minor
Overall Average		3,77	Highly Worth It	Highly Worth It

Based on the results of the recapitulation of the expert assessment, an overall average score of 3.77 was obtained. The value is in the interval of 3.26–4.00, so the media of hanging ball smes training is included in the very feasible category. Thus, the hanging

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

ball smes training media is declared suitable for use in the next trial stage after minor revisions are made according to expert input.

The product revision was carried out after the hanging ball smes training media obtained an assessment from material experts and media experts and after a small group test was carried out. The revision stage aims to refine the product before it is used in field tests. Product revisions are carried out based on expert input and the results of media coverage in small groups.

In general, the results of expert validation show that the media for hanging ball smes training is in the very feasible category. The results of the small group test also showed an increase in the accuracy of the smes after using the media. However, some aspects still need to be refined to make the media safer, more practical, and ready to be used in field tests with a larger number of subjects.

Revisions Based on Expert Input

Expert input is the main basis in improving the media for hanging ball smes. Material experts provide advice related to the suitability of the media with the characteristics of the smes technique and the characteristics of the smesh. Meanwhile, media experts provided input related to aspects of appearance, practicality, security, and clarity of media use instructions.

Table 4. Product Revision Based on Expert Input

No	Revised Aspects	Expert Input	Revision Follow-up
1	Media height adjustment	A key or height adjuster is required that can adjust the size of the media to the height of the mixer	Added and strengthened a high locking system so that the ball can be adjusted to the player's range
2	Media size	The media needs to be adapted to the characteristics of the sneer	Adjusts the position of the ball and the height of the media so that it can be used by players with different heights and jumping abilities
3	Clarity of media usage	The media should be equipped with clear instructions for use	Compile instructions for the use of media in a sequential manner starting from tool preparation, height setting, exercise implementation, to tool storage
4	Standard Operating Procedures	There is a need for SOPs for the use of hanging ball smes training media	Develop SOPs for media use so that players and coaches have safe and consistent usage guidelines
5	Media security	The media needs to pay attention to safety aspects when used in training	Reinforcing the frame section, checking the stability of the wheel, and adding guards to parts that could potentially come into contact with the player
6	Suitability of smes technique	Media use materials need to be supported by explanations of smes techniques	Added technical explanations of prefixes, rejects, hand touches with balls, stroke direction, and landing
7	Measurement results support	The media needs to be supported by valid and reliable instruments	Conduct a test of the validity and reliability of the instrument before the media is used at the trial stage
8	Media Familiarity	The media has the potential to be used in a variety of training conditions	Emphasizing that media can be used in indoor and outdoor training by paying attention to safe field conditions

Based on the table, the product revision is directed at improving the technical quality of the media to better suit the needs of the smes training. The revision does not change the main function of the media as a tool for training the precision of the SMES, but strengthens the quality of media use in the field.

IV. DISCUSSION

The results of the study show that the suspended ball training media developed is feasible and effective to be used to improve the accuracy of smes in volleyball club players of Rokania University. This is evidenced through the results of expert validation, readability tests, instrument validity and reliability tests, small group tests, product revisions, and field tests after product revisions.

Based on the results of expert validation, the media practice of hanging ball smes obtained an average score of 3.77 with a very decent category. These results show that the media has met the aspects of content feasibility, design, safety, practicality, and suitability with the training objectives. Three subject matter experts and one media expert gave an assessment that the product is worth using, although there are some suggestions that need to be followed up in the form of minor revisions.

Input from experts is mainly related to media height adjustment, preparation of SOPs, instructions for use, and safety aspects. This shows that it is not enough for the media to be judged only by physical form, but also to pay attention to the procedures of use and safety of the players. Therefore, product revision is an important stage so that the media is better prepared to be used in field tests.

The results of the small group test showed an increase in the accuracy of smes after students used the smes training media of hanging balls. The average pretest of 89.10 increased to 111.10 in the posttest. An increase of 22.00 points or 24.69% shows that the media has a positive influence on the accuracy of SMES. The results of the Paired Sample t-test showed a significance value of $0.000 < 0.05$, so there was a significant difference between the pretest and posttest results in the small group test.

After a small group test, the media is then revised again before being used in the field test. The revisions were made to clarify the instructions for use, strengthen the high setting system, pay attention to the safety of the training area, and ensure that the media is stable during use. This revision stage shows that product development is carried out gradually and systematically.

The results of field tests after product revision showed that the hanging ball smes training medium still provided improved results in a wider number of subjects. The average pretest in the field test was 90.86, increasing to 110.08 in the posttest. An increase of 19.22 points or 21.15% shows that the final product of hanging ball smes training media is effectively used in smes precision training.

The results of the normality test in the field test showed that the posttest-pretest difference data was not distributed normally, so the analysis was continued using the Wilcoxon Signed Rank Test. The results of the Wilcoxon test showed a significance value of $0.000 < 0.05$. Thus, there is a significant difference between the results of the pretest and posttest in the field test. These results prove that the revised hanging ball smes training media has a significant influence on improving the accuracy of smes.

The increase in smes accuracy occurs because the hanging ball smes training media provides a more stable ball position. A stable ball position helps players repeat movements more consistently. Players can improve the start, repulsion, hand grip with the ball, stroke direction, and landing. In addition, this medium helps players reduce dependence on tosser, so that training can be done more independently.

In volleyball, smes is an attack technique that requires coordination between strength, speed, jump time, and precision of the direction of the shot. The accuracy of the smes is not only determined by the hardness of the blow, but also the player's ability to place the ball in the target area. Therefore, targeted and repetitive training is needed so that players are able to control their shots better.

The media of hanging ball smes training helps players practice the accuracy of the target because the ball is placed in a certain position. With these conditions, players can focus more on the direction of the shot and the point of possession of the ball. Repetitive exercises allow players to form a more stable movement pattern. This is in accordance with the principle of motor skills training, which is that skills can be improved through systematic, repetitive practice, and getting feedback.

The results of this study also show that simple training media can have a positive impact if designed according to the needs of the players. Hanging ball media not only functions as a training tool, but also as a means of learning smes techniques. Coaches can use this medium to observe players' technical errors, while players can use them to improve moves independently.

Thus, the hanging ball smes training media developed in this study has a contribution to improving the quality of volleyball training. This media can be an alternative for trainers in providing a variety of exercises, especially to improve the accuracy of smes. In addition, this media can also help players practice more actively, independently, and in a targeted manner.

V. CONCLUSIONS

Based on the results of research and development of hanging ball smes training media to improve the accuracy of smes in volleyball club players of Rokania University, it can be concluded as follows.

First, the product produced in this study is a hangball smes training medium designed to help players improve smes accuracy through more directed, independent, and repetitive training. This media was developed by paying attention to the needs of

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

volleyball training, especially in terms of adjusting the height of the ball, the stability of the ball position, the safety of use, the ease of moving the tools, and the suitability with the characteristics of the smes technique. Second, the media for smes training in hanging ball is stated to be very feasible based on the results of expert validation. Validation was carried out by three material experts and one media expert. The results of the expert assessment showed that the media obtained an overall average score of 3.77 in the very feasible category. These results show that the media has met the aspects of content feasibility, design, safety, practicality, ease of use, and suitability with the purpose of volleyball smes training. Third, the instrument used in the assessment of the hanging ball smes training media was declared valid and reliable. The results of the validity test using the Content Validity Ratio (CVR) and Content Validity Index (CVI) showed that all items of the instrument met the validity criteria. Furthermore, the results of the reliability test obtained a Cronbach's Alpha value of 0.823. This value is greater than the minimum limit of 0.70, so the instrument is declared reliable and has good internal consistency. Fourth, the results of the small group test showed that the media of hanging ball smes training provided an increase in the accuracy of student smes. The average pretest score in the small group test of 89.10 increased to 111.10 in the posttest.

The average increase of 22.00 points or 24.69% shows that the use of hanging ball smes training media is able to increase the accuracy of smes. The results of the Paired Sample t-test showed a significance value of $0.000 < 0.05$, so there was a significant difference between the pretest and posttest results. Fifth, after product revisions based on expert input and small group test results, the hanging ball smes training media was tested at the field test stage. The results of the field test showed that the average pretest score of 90.86 increased to 110.08 in the posttest. The average increase of 19.22 points or 21.15% showed that the revised hanging ball smes training media was effectively used on a wider number of subjects. The results of the Wilcoxon Signed Rank Test show a significance value of $0.000 < 0.05$, so there is a significant difference between the results of the pretest and posttest in the field test. Sixth, the hangball smes training media has several advantages, namely it can be used for independent training, helps players repeat movements consistently, makes it easier for coaches to observe smes techniques, can be adjusted to the characteristics of the player, is easy to move, and can be used in indoor and outdoor training. It also helps players improve the point of contact of the ball, the direction of the shot, the jump time, and the accuracy of the target.

Based on all the results of the study, it can be concluded that the hanging ball smes training media developed in this study was stated to be very feasible, practical, safe, and effective to be used as a training medium to improve the accuracy of smes in volleyball club players at Rokania University.

ACKNOWLEDGMENT

Thank you to those who contributed to this research, especially the thesis supervisors in the master of sports science programme, Yogyakarta State University.

REFERENCES

- 1) Ariani, A. (2021). Discrepancy Evaluation Model ... 22. In Jurnal Pahlawan | (Vol. 17, Issue 02).
- 2) Arikunto, S. (2016). Prosedur Penelitian Suatu Pendekatan Praktik. Jakarta: Rineka Cipta.
- 3) Abdul Narlan & Dicky Tri Juniar. (2020). Pengukuran dan Evaluasi Olahraga (Prosedur Pelaksanaan Tes Dan Pengukuran Dalam Olahraga Pendidikan dan Prestasi) (pertama). Deepublish.
- 4) A. Syauqi. (2020). Jalan Panjang Covid19 (sebuah refleksi dikala wabah merajalela berdampak pada perekonomian). JKUBS Vol.1 No.1
- 5) Abdiliah, D. M., Rasyid, W., & Barlian, E. (2022). Available online at : <http://journal.unj.ac.id/unj/index.php/gjik> Permalink / DOI : <https://doi.org/10.21009/GJIK.125.07> THE INFLUENCE OF EXERCISE METHODS AND EYE-FOOT COORDINATION ON THE SMES ABILITY. 13(03), 316–329.
- 6) Azhar, K., Tampubolon, A. M., Nazliah, R., Ilmu, T., Tebing, T. A., & Batu, U. L. (2024). Mendeskripsikan Pentingnya Pengintegrasian Media dan Teknologi dalam Pembelajaran. 7(September).
- 7) Azzahroh, M. H., & Syamsudin, F. (2025). Available online at : <http://journal.unj.ac.id/unj/index.php/gjik> Permalink / DOI : <https://doi.org/10.21009/GJIK.164.11> The Effect of Stair up and down Training on Jump Height and Smes Point Obtainment in Male Volleyball Athletes. 16(04), 598–606.
- 8) Fauzi, F., Dwiandaka, R., Pamungkas, O. I., & Silokhin, M. N. (2021). Analisis biomotor kecepatan reaksi pada pemain bola voli kelas khusus olahraga Daerah Istimewa Yogyakarta. Jurnal Keolahragaan, 9(2), 246–255. <https://doi.org/10.21831/jk.v9i2.41704>
- 9) Fernando, J. (2022). Jurnal Olahraga dan Kesehatan Indonesia (JOKI) available online at <https://jurnal.stokbinaguna.ac.id/index.php/jok> MEDIA PEMBELAJARAN BOLA VOLI INTERAKTIF. 2, 94–99.

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

- 10) Gazali, N. (2016). Kontribusi Kekuatan Otot Lengan Terhadap Kemampuan Servis Atas Atlet Bola voli . *Journal of Physical Education, Health and Sport*, 3(1), 1–6.
- 11) Info, A. (2025). Biomechanical Study of Smes Movement Technique in Education Students of UMKT. 9(3), 1047–1054.
- 12) Ismoko, A. P., & Sukoco, P. (2013). Pengaruh Metode Latihan Dan Koordinasi Terhadap Power Tungkai Atlet Bola Voli Junior Putri. *Jurnal Keolahragaan*, 1(1), 1–12. <https://doi.org/10.21831/jk.v1i1.2339>
- 13) Iswayudi, Nanda, I. sugeng. (2017). PEMBELAJARAN PERMAINAN BOLA VOLI DENGAN PENDEKATAN MODIFIKASI (Pada Siswa-Siswi Kelas VII SMP Negeri 23 Surabaya) Tahun ajaran 2017 / 2018). *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2017*, 41(2), 84–93.
- 14) Jurnal, S., Bola, P., Kelas, V., & Dan, S. D. N. (2024). PENGARUH MEDIA HALANG RINTANG TERHADAP PENINGKATAN JANGKAUAN SMES DAN BLOCK PADA. 2, 121–132.
- 15) Kardiyanto, D. W., & Wijanarko, B. (2021). Antropometri dan Biomotorik Atlet Bola voli Duduk Paralympic Indonesia ditinjau dari Karakteristik Cidera dan Kualitas Kondisi Fisik. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, 5(1), 136–145. <https://doi.org/10.31539/jpjo.v5i1.2840>
- 16) Krisimon, Y., Rahman, A., Ayu, S., & Putri, R. (2024). Development of Drill Smes Training Models in Straight and Cross Directions to Improve Volleyball Smes Results at the SONS Club (Sriwijaya State Sports School) Palembang. 3(July), 312–323.
- 17) Laporta, L. (2018). Interaction network analysis of the six game complexes in high- level volleyball through the use of Eigenvector Centrality. 1–14.
- 18) Latar, I. M. (2015). Meningkatkan Keterampilan Bola voli Mahasiswa Penjas Dengan Metode Latihan. *Journal of Physical Education Health and Sport*, 2(1), 1–10.
- 19) Mahfud, R. M., Anwar, K., Hidayatullah, F., Studi, P., Olahraga, P., Keguruan, S. T., Pendidikan, I., & Bangkalan, P. (2023). Latihan Bola Gantung Terhadap Ketepatan Smes Pada Ekstrakurikuler Bola Voli Hanging Ball Training on Smes Accuracy in Volleyball Extracurriculars. *Jambura Journal of Sports Coaching*, 5(2), 142–148.
- 20) Mayindy, T. P., & Yulianti, T. (2024). Media Pembelajaran Teknik Bola Voli Berbasis Android untuk SMPN 13 Bandar Lampung Program Studi Sistem Informasi , Universitas Teknokrat Indonesia , Indonesia Android-based Volleyball Technique Learning Media Application at SMPN 13 Bandar Lampung. 4(4), 165–174.
- 21) Media, P., Interaktif, V., Pembelajaran, D., Dasar, T., Voli, B., & Minat, T. (2025). PENGARUH MEDIA VISUAL INTERAKTIF DALAM PEMBELAJARAN TEKNIK DASAR BOLA VOLI TERHADAP MINAT BELAJAR SISWA THE EFFECT OF INTERACTIVE VISUAL MEDIA IN LEARNING BASIC VOLLEYBALL Indonesian Journal of Physical Activity PENDAHULUAN Pendidikan jasmani memiliki per. 5(1), 94–107.
- 22) Modifikasi, B., Belajar, H., Voli, B., & Bawah, P. (2025). Artikel info. 1, 177–183.
- 23) Permana, H., & Suharjana, S. (2013). Pengaruh Sirkuit Training Awal Akhir Latihan Teknik Terhadap Kardiorespirasi, Power, Smash, Passing Bawah Atlet Bola Voli. *Jurnal Keolahragaan*, 1(1), 49–62. <https://doi.org/10.21831/jk.v1i1.2345>
- 24) Pranopik, M. R. (2017). Pengembangan Variasi Latihan Smes Bola Voli. *Jurnal Prestasi*, 1(1), 31–33. <https://doi.org/10.24114/jp.v1i1.6495>
- 25) Raditia, P., Kusumawardhana, B., & Hadi, H. (2021). Pengembangan alat latihan smes dan setter bola voli di Taruna Merah Putih Semarang. *Journal of Physical Activity and Sports (JPAS)*, 2(3), 315–321. <https://doi.org/10.53869/jpas.v2i3.106>
- 26) Runesi, S., Ardian, F. R. D., Tajuddin, A. I., & Mantolas, D. (2023). Pengaruh Latihan Memukul Bola Gantung Terhadap Ketepatan Smes Peserta Ekstrakurikuler Bola Voli Di Sma Efata Soe. *Jurnal Muara Pendidikan*, 5(2), 35–43.
- 27) Silviantia, N. A., Gazalib, N., Penjaskesrek, J., Penjaskesrek, J., Islam, U., & Pekanbaru, R. (2023). EFEKTIVITAS MEDIA PEMBELAJARAN INTERAKTIF DALAM MENINGKATKAN. 2(2), 326–331.
- 28) Suhardiman, M. A., Makassar, U. N., Info, A., Training, P., Ability, S., & Games, (2024). SMES ABILITY IN VOLLEYBALL GAMES SENIOR HIGH SCHOOL : THE PLYOMETRIC TRAINING AND LEG MUSCLE. 3(3), 148– 157.
- 29) Sumantri, A. (2020). KONTRIBUSI KEKUATAN OTOT LENGAN TERHADAP KETERAMPILAN SMES BOLA VOLI DI SMAN 2 SELUMA.
- 30) Kinestetik : Jurnal Ilmiah Pendidikan Jasmani, 4(1 SE-Articles), 1–6. <https://doi.org/10.33369/jk.v4i1.10196>
- 31) Supriadi, E. (2022). SPRINTER : Jurnal Ilmu Olahraga Pengembangan Model Video Pembelajaran Passing Atas Dalam Permainan Bola Voli. 3(2).
- 32) Triandi, N. A., & Hariyadi, K. (2021). SPRINTER : Jurnal Ilmu Olahraga Pengembangan Media Pembelajaran Berbasis Multimedia Interaktif Materi Teknik Dasar Bola Voli. 2(3), 256–261.
- 33) Umam, F. N., & Achmad, I. Z. (2024). Modifikasi Media Bola Busa Terhadap Pembelajaran Servis Bawah Bola Voli Pendahuluan. 7(2), 744–756. <https://doi.org/10.29408/porkes.v7i2.26768>

Development of Hanging Ball Smash Practice for Improving the Smash Accuracy of Volleyball Club Players

- 34) Usman, J., & Argantos. (2020). Jurnal Performa Olahraga. Jurnal Performa Olahraga, 5(1), 18–25.
- 35) Usnata, N. (2018). Tingkat Antropometri Dan Biomotor Atlet Bola voli Pbv. Surabaya Bayangkara Samator. Prestasi Olahraga, 1(3).
- 36) Zulhermandi, Saputra, R., & Wakidi. (2015). Penerapan Media Bola Gantung Untuk Meningkatkan Aktivitas Smes Dalam Permainan Bola Voli Pada Siswa Kelas X B SMA Negeri 1 Nanga Pinoh. Jurnal Pendidikan Jasmani Kesehatan Dan Rekreasi, 2(1), 18–29.



There is an Open Access article, distributed under the term of the Creative Commons Attribution – Non Commercial 4.0 International (CC BY-NC 4.0) (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits remixing, adapting and building upon the work for non-commercial use, provided the original work is properly cited.