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VOLLEYBALL ATTACK TRAINING FOR PHYSICAL EDUCATION UNIVERSITY STUDENTS

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Abstract

Volleyball Attack Training Methods is a training method developed to train models of basic volleyball attack technique. Indonesian Physical Education made volleyball training compulsory. However, there is little attention given for its training. To fill this practical gap, this article reports on the adoption of volleyball attack training to university students majoring in physical education. There were several motion exercises from easy to difficult to be practiced by students. This study used comprehensive approach. This method is arranged based on four-stage volleyball attack motion. The first stage is the prefix or run up (Approach), the second stage is taking off, the third stage is hit, and the fourth stage is landing. This study aims to produce a Volleyball Attack Training Method in Sports Science Faculty Students. The research method uses the Borg and Gall Development Research Method which is adapted to the needs with the following steps: (1). Research and Information Collecting, (2). Planning, (3). Develop Preliminary of Product, (4). Preliminary Field Testing, (5). Main Product Revision, (6) Final Product Revision, (7). Dissemination and Implementation. The findings indicate that the attack training was found to be effective to help students acquire ability to attack better during a volleyball match.

Keywords: Attacking Volleyball, Exercise Methods, Research and Development, Sport Science.

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Introduction

Volleyball is a team sport that is played at all levels (for example, youth, the Olympics, professional) and sports that focus on movements that use muscle explosive power such as jumping, attacking, and blocking. (Marques, Badillo, & Kluka, 2006). According to Suharno, volleyball game is a team sport played by two teams, each team consisting of six players on a playing field measuring 18m x 9m (Suharno, 1991).

According to Ahmadi (2007) volleyball is a complex game that is not easily done by everyone, because in the volleyball game it requires coordination of motions that can really be relied upon to do all the movements that exist in the game of volleyball. Volleyball is also a very challenging sport because the ball is played soaring high in the air, so players must react as fast as possible to the ball and devise a strategy to return the ball (Isada & Valleser, 2017). Therefore, volleyball requires good mastery of

basic techniques so that the game can be played perfectly (Yudasmara, 2014).

Nowadays volleyball has grown rapidly, especially from the regulatory system that has undergone many changes. Initially the system used was a side out scoring system where only the team that was doing the service could get points or points, then developed into a rally scoring system where both teams had the chance to get points in a rally. The purpose of this system change is that the length of the game time is more predictable (Kovacs, 2009). So the change in the points acquisition system is very demanding in terms of the maturity of a player's technique and the effectiveness of the attacks carried out, because the shorter the rally carried out, the more likely it is to get points (Sánchez-Moreno, Rui, Mesquita, & Aurelio, 2015).

Various sports have differences that are seen from the characteristics of each sport that are adapted to the basic skills possessed by these sports. The basic skills of a sport will later develop into basic techniques and advanced techniques that are used to achieve maximum performance. Maximum achievement will not be possible to be created properly without the acquisition of technical skills correctly. According to Yudasmara, that the basic technique of volleyball is a very important element in the game of volleyball, without good mastery of basic techniques, the game cannot be played perfectly (Yudasmara, 2014). Beutelstahl (2008) explains that technique is a procedure that has been developed based on practice and aims to find a solution to a particular movement problem in the most economical and useful way. The basic techniques contained in the game of volleyball greatly affect one's skills in the game of volleyball which later will be very useful for gaining victory.

The basic technique of volleyball has a very important role before the players improve their abilities on higher skills. The basic techniques contained in the volleyball game according to Ahmadi (2007) consist of service, underhand pass and overhead pass, block, and attack. In line with Winarno and Sugiono in the History & Basic Techniques of the Volleyball Game, it is said that in general the basic techniques of the volleyball game can be divided into four components which include: lower and upper service techniques, lower and upper passes, attacks, and blocks (Winarno & Sugiono, 2011).

Universitas Negeri Jakarta as one of the tertiary institutions that has a Faculty of sports science is always prioritizing quality standards in order to guarantee the quality of the competence of its graduates. Volleyball theory and practice courses are one of the compulsory subjects in the Faculty of Sport Sciences. In this course, the objective of the training is that students are able to perform the basic technical movements of volleyball. Based on observations using in-depth interviews with instructors of volleyball theory and practice courses, researchers found that in the learning process students were given all the basic techniques available in the game, but the teacher revealed the learning outcomes of the attack technique were still unsatisfactory. When conducting a field survey, researchers found several common mistakes such as (1) Mistakes that made the attack prefix, such as steps too wide, not suitable between footsteps and hand swings. When jumping, both hands are swung downward through the back, so as not to maximize the height of the jump. (2) Take off under the ball. (3) Touching the net after attacking. (4) Doing repulsion on one foot. (5) The rhythm of the prefix, jump, whip / punch, and landing are less regular or intermittent, so that the movement of the attack becomes flexible or stiff. During the learning process, the instructor only uses the Whole Method which is too difficult to study the overall attack movement because the attack movement is too complex. These mistakes and improper training methods make Attack learning outcomes less than optimal.

Attack as part of the basic technique of volleyball which has an important role when carrying out attacks, must be done well to get points. Attack techniques require timeliness, coordination of motion, and speed of decision making to calculate the direction of the blow. With the current rally point system rules, mastering the attack movement is absolutely essential for a player to master because attacks in volleyball games are identical to attack techniques, this technique is very admirable and very popular in volleyball games. Almost every player wants to use this technique as their attack to get as many points as possible.

Attack technique requires very high skills, in line with the opinion of Reynaud (2011) attack is a very difficult technique, where the player makes a jump to hit the ball that moves on the net and at the same time must avoid the block by the opposing player to drop the ball into the opponent's area without being able to be returned by the opponent's defender. According Suharno (1991, p. 28) "Attack is to jump as high as possible and hit the ball on the net with the aim of dropping the ball on the opponent's pitch as quickly as possible". Ahmadi (2007) also believes that an attack is a hard blow from the top down and swooping into the opponent's field.

Attack training model is an exercise used by a coach or teacher to provide different material to athletes or students to avoid a boredom and also boredom in training. Each teacher or trainer in

preparing training or learning material must think about variations in the training menu. Because the training model is very important to maintain the interests and activeness of students in following the process of training activities. According to Harsono (1988, p. 121) "variations of the exercise are done to prevent the possibility of athlete boredom. The trainer must be creative and clever in finding and applying variations of the exercise ". According to Budiwanto (2012, p. 22) "in an effort to overcome boredom and monotonous training, it is expected that a creative trainer with a lot of knowledge and various types of exercises that may be able to vary and change periodically".

There are several types of attack techniques, namely: normal attack, spring attack, attack pull, attack push (Winarno & Sugiono, 2011). A player to be able to attack must pay attention to the process of implementing the attack. According to Winarno (2011, p. 76) "The process of conducting an attack can be divided into four stages: when taking a prefix, when taking repulsion, when making a blow, and when making a landing". This stage is also in line with the opinion of Lenberg (2006) that in conducting an attack has four stages, among others, the first stage is approach, the second stage is Proper Arm Swing, the third stage is Ball Contact, and the fourth stage is landing. According to Paula Weishoff "The attack breaks down into six basic movements: the approach (number of steps to the ball), plant or step close (positioning of the feet for the jump), jump (positioning of the body in the air), arm swing (bow and arrow, straight arm, circular swing, and roundhouse swing), contact and follow-through (hand position on the ball), and landing. "(Weishoff, 2002).

The basic technique of attack or spike that is commonly done is the normal spike, according to Roesdiyanto (1991, p. 20) "Normal spikes are done by making a blow by bouncing the ball high enough that is more than 3-meters and the ball is calm. Try the ball during the trajectory is 20-50 cm from the net. The distance of the falling ball is around the area which is half the distance from that measured at the place where the setuper is standing until the head of the projection point where the speaker starts taking the prefix ". In carrying out these normal attack techniques the most important thing is to pay attention to the prefix stage, repulsion stage, stroke stage, and landing stage when conducting normal attacks.

Approach

This prefix attitude really determines the attack that is produced. The basic steps are according to the habits of each individual. Attacker does the prefix by stepping when the ball reaches its highest point on the net (Winarno & Sugiono, 2011). According to Beutelstahl (2008, p. 25) "players start running toward the ball, it depends on the type of ball and the fall of the ball. Players take a distance of 2.5 to 4 meters from the net. Players take 2 to 3 steps then jump on 2 legs ". Suharno (1991) said that footsteps toward the ball, start stepping when the ball at the highest point above the net in the process will go down. From the expert's opinion above, it can be concluded that the initial step to carry out a normal attack is to first take positions 3 to 4 meters from the net. Before doing the prefix, see the position of the ball in the bait. When the ball is at its highest point, start 3 steps then jump with both feet.

Take off

Footsteps when taking the prefix is followed by bending both knees to help repel upward. Repulsion starts with the heel and toes stamping on the floor and swinging both arms forward at the same time as both feet push up (Suharno, 1991). According to Beutelstahl (2008, p. 26) "when rejecting movement must take place smoothly and continuously. Back slightly bent with arms slightly bent. The other arm stays high above the head, this arm is what regulates overall balance. " From the expert opinion above, it can be concluded when refusing the body to move backwards and both arms pulled up one of the hands slightly bent to get maximum power. The other hand stays straight to maintain balance. Vertically upward, not forward. When hovering, stay focused on the ball.

Hitting the ball

After repulsion and when floating in the air both legs must limp hanging and the right hand (the hand used to hit the ball) for the right-handed is ready to hit the ball, with the arm raised so that the upper arm of the right hand is perpendicular to the body. When the jump and reach of the hand have reached a high point, then the blow is done immediately (Winarno & Sugiono, 2011). Imposition occurs on the entire surface of the palm and on the upper ball. The wrist should not be stiff and the fingers are slightly opened after hitting the arm and moving forward and down (Beutelstahl, 2008). Meanwhile, according to Suharno (1991, p. 56) "the distance of the ball in front of a range of hitting arms. Immediately whip your arms quickly with the longest and highest arm range towards the ball ". From the expert opinion above, it can be concluded that the attack technique occurs in the entire palm of the hand, the wrist is bent down and hit the ball at the top to produce a spin top spin. When carrying out attacks note the distance between the hand and the net so that the hand does not touch the net.

Landing

After attacking the player lands on two legs flexed. At the time of landing the knees are flexed to reduce the impact of the feet with the floor (Suharno, 1991). Landing is done with the soles of the front legs. "Try to make the landing place not move far from the place during the repulsion" (Winarno & Sugiono, 2011, p. 78). According to Beutelstahl (2008, p. 28) "at the landing stage the foot is directed forward to maintain balance and the body is slightly bent forward. Landing with both feet with knees bent in accordance with landing requirements. From the expert opinion above it can be concluded that when landing both feet must land simultaneously to reduce the risk of injury to the ankle. When landing both knees are bent followed by a slight bending of the body. Try the position when landing not far from the position when jumping.

According to Lenberg (2006, p. 57) In conducting attack exercises, there are several Coaching Points that must be considered by trainers and teachers in providing material, namely Coaching Points for the Approach and Coaching Points for Armswing, Ball Contact, and Landing. Coaching Points for the Approach include Use a four-step approach. Start slowly and end quickly. The footwork pattern for a right-handed hitter is right-left-right-left. The footwork pattern for a left-handed hitter is left-right-left-right. Accelerate as you progress through the approach. Think slow, faster, fastest. Think small, bigger, biggest. Use a two-footed approach jump. The step close (last two steps) should be the fastest and most explosive. At the third step (plant or hop) you should be 12 inches (30 centimeters) from the ball. During the last two steps (step close), feet are pointing in the direction they are traveling as you prepare to attack the entire court. "Chase" the ball. Coaching Points for Armswing, Ball Contact, and Landing include Hands are down, not up and not out, as you begin the approach. The swing begins on the second step of a four-step approach. Think bow and arrow. Contact the ball as high as you can in front of you. Use a fast armswing. Use a powerful wrist snap. Use a two-footed landing with knees slightly bent.

Volleyball theory and practice courses are an inseparable part of the curriculum at the Faculty of Sport Science, Universitas Negeri Jakarta. For this reason, efforts need to be made to improve the results of the less than attack training. One of the improvement efforts is to make improvements in the training process, namely by developing Volleyball Attack Technique Training Methods for Students of the Faculty of Sport Science, Universitas Negeri Jakarta. According to the Big Indonesian Dictionary, the method is a systematic way of working to facilitate the implementation of an activity in order to achieve the specified goals (Depdikbud, 1994). Furthermore, according to Rusli Lutan, the method is a scientific activity related to a way of working (systematic) to understand a subject or object of research, as an effort to find answers that can be justified scientifically and include its validity (lutan, 2003). Ahmad Tafsir (2007) argues that the method is the most appropriate and fast way of doing things, where the exact and fast words are often expressed effectively and efficiently. Effective teaching means teaching that can be understood by students perfectly. In education it is also often said that teaching works with students. To function means to belong to the student, the teaching shapes and influences his personality. The right teaching is teaching that does not require a long time. So the method is simply determining the procedure to be followed (Tafsir, 2007).

Exercise is a process of conscious improvement of athletes to achieve maximum quality of achievement by being given physical, technical, tactic, mental load that is organized, directed, increased, gradual, and repetitively timed (Suharno, 1993). If this is related to volleyball, especially in terms of attacking exercises, the above theory must be really understood and considered, so that the objectives of the training provided can achieve maximum results, which can be known by the ability of players to apply it in a match.

The training aims: (1) to achieve and enhance multilateral physical development, (2) to develop specific physical according to the needs of the sport that is occupied, (3) to improve the techniques of the sports branches, (4) to improve and perfect the techniques and strategies that are needed, (5) to improve personality, (6) to guarantee and secure optimal preparation of individuals and teams, (7) to maintain athlete's health, (8) to prevent injury, and (9) to improve theory (Bompa, 1986.).

The training method is basically a method used by a trainer in implementing the exercises so that the exercises can run well and the training objectives can be achieved. According to Andi Suhendro, "The training method is a systematic and planned way, which functions as a tool to improve physiological, psychological and movement skills, in order to have better skills in a particular appearance" (Suhendro, 2004).

Based on the understanding of the training methods above it can be concluded that, the training method is a method used by a coach or trainer that serves as a tool to improve the abilities or skills of the athlete being trained. A trainer must be able to implement effective training methods, because the success of the exercise can be influenced by the training methods applied by the trainer.

The number of training methods that can be applied in sports training, achievement requires a coach must always develop his knowledge. Sugiyanto stated, "Ways or methods that are often used in teaching sports movements are of several kinds, including: (1) the overall practice method, (2) the part practice method, (3) the drill method, (4) the problem solving method, (5) the accuracy method (6) the speed method, (7) the match method, (8) the interval method, and (9) the repeat method "(Sugiyanto, 1998). Of the various types of technical training methods, a trainer can choose one or several training methods according to the needs and objectives to be achieved in the exercise.

The training method was developed to facilitate the process of practicing the basic technique of volleyball attack, where the developed training method pays attention to the stages of motion training to become a skill and practice principle ranging from easy to difficult to make it easier for students to understand. Training Method Development is a series of processes or activities carried out to produce an exercise method based on an existing development theory. the training method is the use of an approach in training. Many training methods are developed by experts in their fields, each training method has different characteristics and different uses. Basically all the training methods developed are aimed at improving the results of the exercise.

Development of good training methods adapted to certain conditions. This condition is the size of the training material complex or not. The training method is an approach that is used as a guide in planning training in the field to direct us in designing exercises to help teachers or trainers in such a way that the training objectives are achieved.

Based on the background of the problems that have been described above, the researcher believes that efforts should be made to improve the results of the less than optimal attack training. The training method is a step pattern that includes the analysis, development, and evaluation of the results of the exercise in order to make it easier for students to achieve results. Therefore, the training method developed in this study involves volleyball attack training using Part and whole method. Part and whole training methods developed to facilitate the process of practicing basic volleyball attack techniques. Where the developed training method pays attention to the stages of motion training to become a skill and practice principle ranging from easy to difficult to make it easier for students to understand. In line with the opinion of Muttaqin (2016) that the product development of volleyball attack training methods will be packaged into a guidebook that can be used by students anytime and anywhere. That way students can learn the correct techniques to improve volleyball attack skills. This research is a research and development of Volleyball Attack Training Method in which the training method created will be broken down into a number of training models that pay attention to the stages of motion training in order to become a skill and practice principle ranging from easy to difficult to make it easier for students to understand.

Method

Reseach Design

Research and development are used in this study because it is longitudinal in nature. Development research (development research) finds patterns, sequences of growth, change and especially has the intention to develop teaching materials for schools. Examples of the development of training materials are textbooks, teaching aids, modules and so on. Development research is research that is not used to test the theory but the resulting model is tested in the field then revised until the results are satisfactory.

Borg and Gall states that, research and development (R & D), is a research method used to develop or validate products used in education and training (Sugiyono, 2010).

Three things that are always related to development research are research (evaluation), evaluation (evaluation), and development. The research process has several objectives including to find or know something (need to know), the evaluation process aims to determine the choice (need to choose), and the development process aims to find an effective method or method (need to do) (Susilo, 2009).

Research is a process of collecting, processing, analyzing and summarizing data that is supported by conceptual studies and theoretical frameworks in order to solve problems for a particular purpose, namely research objectives. Research is also divided into several forms, including comparative quantitative research, associative quantitative research, qualitative research, program / policy evaluation research, instrument development research, model development research, action research research. From some of these studies one form of research that researchers will use is research and development. Research and development methods or in English Research and development is a research method used to produce certain products, and test the effectiveness of these products.

Research and development is one of the relevant research methods and can always be used because development research is longitudinal. Development research (development research) finds patterns, sequences of growth, change and especially has the intention to develop teaching materials for schools.

Examples of the development of training materials are textbooks, teaching aids, modules and so on. Development research is research that is not used to test the theory but the resulting model is tested in the field then revised until the results are satisfactory.

Development Procedure

According to Borg and Gall (1983), what is meant by research and development methods is "a process used develop and validate educational products". Sometimes this research is also called 'research-based development', which appears as a strategy and aims to improve the quality of education. In addition to developing and validating educational outcomes, research and development also aims to discover new knowledge through 'basic research', or to answer specific questions about practical issues through 'applied research', which is used to improve educational practices.

Borg and Gall (1983) argue that, the research and development (R&D) approach in education includes 10 steps. The chart of research steps is as follows:

1) Research and Information Collecting

This first step includes a needs analysis, literature study, literature study, small scale research and required report standards.

2) Planning

After conducting a preliminary study, the developer can continue the second step, which is planning research. The R & D research plan includes: 1) formulating research objectives; 2) estimating funds, labor and time; 3) formulating the qualifications of researchers and forms of participation in research.

3) Develop Preliminary of Product

These steps include: 1) Determine the design of the product to be developed (hypothetical design); 2) determine the research facilities and infrastructure needed during the research and development process; 3) determine the stages of carrying out design tests in the field; 4) determine the job description of the parties involved in the research.

4) Preliminary Field Testing

This step is a limited product test. These steps include: 1) conducting an initial field test of the product design; 2) is limited, both the substance of the design and the parties involved; 3) the initial field test is carried out repeatedly in order to obtain a decent design, both substance and methodology.

5) Main Product Revision

This step is an improvement to the method or design based on limited field testing. Refinement of the initial product will be carried out after a limited field trial. In this initial product improvement phase, more is done with a qualitative approach. The evaluation is done more on the evaluation of the process, so the improvements made are internal improvements.

6) Main Field Test

This step is a broader product test. This step includes 1) testing the effectiveness of product design; 2) design effectiveness tests, in general, use the experimental technique of repetition methods; 3) The results of the field test are to obtain an effective design, both in terms of substance and methodology.

7) Operational Product Revision

This step is the second improvement after conducting a field test that is broader than the first field test. Completion of the product from the results of this wider field test will further strengthen the product that we have developed, because in the previous field trial stage carried out in the presence of a control group. The designs used are pretest and posttest. In addition to internal improvements. This product improvement is based on evaluating the results so the approach used is a quantitative approach.

8) Operational Field Testing

This step should be carried out on a large scale which includes: 1) testing the effectiveness and adaptability of the product design; 2) design effectiveness and adaptability tests involving potential users of the product; 3) field test results are design methods that are ready to be applied, both in terms of substance and methodology.

9) Final Product Revision

This step will further enhance the product being developed. Improvement of the final product is deemed necessary for more accurate products being developed. At this stage a product whose level of effectiveness can be accounted for has been obtained. The final product refinement has a reliable "generalization" value.

10) Dissemination and Implementation

Report on the results of R&D through scientific forums, or through mass media. Product distribution must be done after going through quality control

The following stages of product development are arranged in a flow chart.

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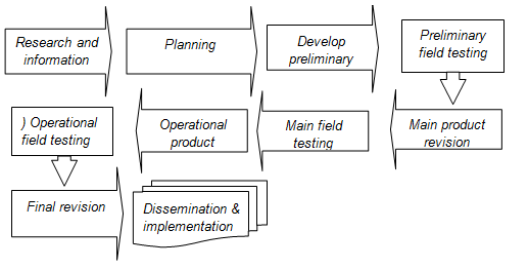

Figure 1. Planning Development of the Borg and Gall Model
(Borg & Gall., 2002)

Based on the 10 steps of development developed by Borg and Gall, researchers adopted these stages into 7 steps as follows:

Table 1. Development research steps adopted

No.	Research Stages	Outputs (Performance Indicators)
1.	Research and Information Collecting.	To conduct a needs analysis there are several criteria, namely 1) Is the product to be developed an important thing for education? 2) Does the product have the possibility to be developed? 3) Do HR have the skills, knowledge and experience that will develop the product? 4) Is the time to develop the product enough?
2.	Planning	The R & D research plan includes: 1) formulating research objectives; 2) estimating funds, labor and time; 3) formulating the qualifications of researchers and forms of participation in research.
3.	Develop Preliminary of Product	1) Determine the product design to be developed (hypothetical design); 2) determine the research facilities and infrastructure needed during the research and development process; 3) determine the stages of carrying out design tests in the field; 4) determine the job description of the parties involved in the research.
4.	Preliminary Field Testing	This step is a limited product test. These steps include: 1) conducting an initial field test of the product design; 2) is limited, both the substance of the design and the parties involved; 3) the initial field test is carried out repeatedly in order to obtain a decent design, both substance and methodology.
5.	Main Product Revision	This step is an improvement to the method or design based on limited field testing.
6.	Final Product Revision	At this stage a product whose level of effectiveness can be accounted for has been obtained. The final product improvement has a reliable "generalization" value.
7.	Dissemination and Implementation	Report on the results of Research and Development.

Model Concepts Developed

Development model is the basis for developing products to be produced. Development models can be in the form of procedural models, conceptual models, and theoretical models. The procedural model is a descriptive model, showing the steps that must be followed to produce a product. Conceptual models are analytical models, which mention product components, analyze components in detail and show

relationships between components to be developed. Theoretical model is a model that draws a framework for thinking based on relevant theories and supported by empirical data.

The model developed in this study is the procedural method of the training method of the basic technique of volleyball attack by paying attention to the stages of motion training in order to become a skill. This is in line with the opinion of Fitts and Posner that the stages of learning one's movements through three phases (Rahayu, 2013), namely:

1. The first phase in learning movement skills is called the cognitive phase, because at this stage students are very focused on processing how a movement should be done. Often beginner students at this stage are observed from their mouths that concentrate fully on what they are doing or are completely oblivious to what is happening around when they are trying to choose what they have to do to display a movement. At this initial stage, students concentrate on obtaining general ideas and sequences of skills.
2. The second phase in learning movement skills is called the associative phase. At this stage of the learning process, students can concentrate more on a dynamic of skills, mastery of the timing, skills and coordination of movements from the skill parts to produce smooth and smooth movements.
3. The third phase in learning movement skills is called the automatic phase. In this phase students do not concentrate on a skill. Processing has moved to the lower center of the brain, where one is free to concentrate on something else. Movement response does not require attention from students.

Research and development in this exercise uses quantitative and qualitative approaches. The research begins by collecting data in the form of needs analysis. Where the needs analysis will illustrate the needs that are the problem of research subjects.

After knowing what needs are being needed by research subjects the next step is to determine the product development plan. The product developed will be evaluated first before being tested to find out its weaknesses and weaknesses. The initial field trial involved 12 test subjects. After the initial trial the product is re-evaluated by revising and perfecting the trial results through observation, interviews and questionnaires. Data collection results are evaluated as a basis for improving the product. After the product is perfected, the product is reported in a meeting and in a journal.

In this research and development it is certainly expected to produce a product that can be used in the Theory and volleyball practice subjects especially volleyball attack for students of the Faculty of Sport Sciences, Universitas Negeri Jakarta. By designing new models or perfecting existing ones in full so that they can be used as other learning resources in the learning process.

Research setting

This research was conducted at the Faculty of Sports Science, Jakarta State University. The research subjects were students of the Faculty of Sports Science, Jakarta State University. The research time is as follows:

Table 2. Research Time

No	Research Stages	Year 2019						
		May	June	July	August	Sept	Oct.	Nov
1.	Research and Information Collecting	■						
2.	Planning	■						
3.	Develop Preliminary of Product		■					
4.	Preliminary Field Testing			■				
5.	Main Product Revision				■	■		
6.	Final Product Revision					■	■	
7.	Dissemination and Implementation							■

Research participant

The participants in this research and development are students of the Faculty of Sport Science, of a university Indonesia who enrolled in volleyball theory and practice courses. Small group trial subjects totaling 10 students were randomly selected. Subjects for field trials were 35 students.

Data collection

Techniques used in data collection in this study include, observations made at the beginning before the production of media (teaching practice activities) and carried out when the use of media in the classroom or in the field. This activity is intended to determine the use of media by educators and students is correct and students are interested in their use. Then next is the Questionnaire consisting of the results of the feasibility test of material experts,

media experts, and students in the form of questionnaires and evaluation sheets.

Data analysis

The data used in this study are qualitative and quantitative data. Qualitative data in this study are data obtained through validation from experts and from students. Before the volleyball attack training model that was developed was declared feasible to be tested in the field, the researchers conducted a validation or feasibility test of the model to five experts namely volleyball experts / lecturers, training media expert lecturers, and volleyball trainers.

The five experts assessed the design of the developed model so that it would be worthy to be tested in the field. The data obtained is used to carry out the process of developing training media products. Quantitative data in this study were obtained through assessment questionnaires analyzed with descriptive statistics. Evaluation results are in the form of scores for criteria for training objectives, training facilities, implementation of exercises and pictures of attack training methods using the Guttman 1-0 scale. The scores and criteria used are as follows: (1) a score of 0 if the answer given is "inappropriate"; (2) a score of 1 if the answer given is "reasonable".

Result and Discussion

The results of the development of the basic attack motion training method are written in the form of a script or storyboard script that presents the forms of the basic attack motion training method with various models.

The results of the development of the attack practice method tested on student participants were written into a scientific article that would be published to the general public. The study presents some basic attack technique training methods that contain material about the basic volleyball attack technique theory and exercises that will be presented with several training methods. Attack exercises presented to students are packaged in several training methods and training models with different levels of difficulty.

Attack exercises will be carried out repeatedly and in groups in each method of attack training that has been modified so that students find it easier to learn in the field. Each attack training model is presented in the same form but the steps are different in each exercise model. Thus the varied training methods are expected to achieve the objectives of the planned training. In this chapter the researcher explains about (1) the presentation of the overall data (needs analysis, evaluation data, trial data), (2) effectiveness, and (3) discussion.

Need Analysis Result

Overall there are four general objectives to be revealed in a preliminary study or needs analysis, namely: (1) how intense volleyball training is, especially on the attack material in line with the training program as formulated; (2) how important is the development of basic attack techniques; (3) what obstacles and support are found in the training model; (4) efforts to improve the attack training program.

Based on these general objectives, researchers conducted a preliminary study using in-depth interviews with instructors of volleyball theory and practice courses as well as conducting surveys because the main objective was to carry out technical preparations by first exploring the characteristics of the research subjects and places they were in. research and development will be conducted. This is to find out how important the attack training method will be developed by researchers.

The results of the preliminary study or field findings are further described and analyzed so that a data formulation can be obtained. The formulation of these results is descriptive and analysis, with reference to the objectives of the preliminary study both general objectives. The following will describe the results of the needs analysis and field findings obtained from the observations of researchers from teachers as well as volleyball trainers at the Faculty of Sports Science, Universitas Negeri Jakarta.

Table 3. Results of Requirement Analysis and Field Findings

No	Item Question	Finding
1	What is taught in volleyball theory and practice courses?	Students are taught the whole basic technique of volleyball both theory and practice. The method used in practical training generally uses a comprehensive practice training method or the Whole Method.
2	How is the material for the basic attack technique given in volleyball theory and practice courses?	Attack technical material is provided with a comprehensive practice training method or the Whole Method. Students are given a thorough attack movement exercise without a ball, then given a comprehensive attack movement exercise using a ball.
3	Are the means available to deliver Attack Technique material adequate?	The facilities used in volleyball technique training are now quite adequate. However, generally the media used are still

		limited to the net, cones and volleyball.
4	What is the enthusiasm of students in following the Attack practice?	Students are enthusiastic in participating in lectures with Attack technique materials, but students look bored if they don't master the technique.
5	What are the common mistakes that occur when learning the basic attack techniques?	1. Mistakes to make the attack prefix, such as steps too wide, do not match between footsteps and hand swings. When jumping, both hands are swung downward through the back, so as not to maximize the height of the jump 2. Take off under the ball 3. Touch the net after attacking. 4. Do repulsion with one foot. 5. The rhythm of the beginnings, jumps, lashes / punches, and landings are less regular or intermittent, so that the attack movements become inflexible or rigid.
6	What efforts have been made to correct these mistakes so students remain interested and are not bored in following the lecture process?	Instruct students to repeat the exercise independently or join a volleyball extracurricular training activity. But the independent training was felt to be less than optimal, and few wanted to join the extracurricular training.
7	Do you need the Attack Volleyball training method?	In general, it is very necessary to develop Attack training methods with varied training models, especially with the inclusion of training models that are adjusted from simple movements to complex movements.

Based on the results of field observations conducted by researchers, researchers found there are common mistakes made by students during the learning process of Volleyball Attack. These errors of motion must be corrected immediately so that no lasting errors of motion occur later, and the formulation of repairs to these errors must be made with the right method.

There are several methods in the world of coaching, namely the practice of division practice and overall practice that has weaknesses and strengths of each. By combining the two methods and developing the training model, it is expected to be able to provide solutions to the improvement of students' movements and to be an alternative variation of the exercise so that there is no saturation. According to Harsono (1988) "variations of the exercise were done to prevent the possibility of boredom in the trainer. The trainer must be creative and clever in finding and applying variations of the exercise ".

The developed training method must pay attention to the stages of motion during attack. With the practice of division practice, the training is divided into several models, including the exercise model without the ball and with the ball, then based on the stages of the attack movement itself, namely Approach, take off, hit (hit the ball), and landing (landed). The method of comprehensive practice is developed by dividing the attack based on the height of the ball, this method is carried out if there are already students who achieve automation on the attack motion. This training method was also developed in an effort to overcome boredom and monoton exercise, in these conditions it is expected that a creative trainer with a lot of knowledge and various types of exercises that allow can vary and change periodically (Budiwanto, 2012).

Model Feasibility

Before the developed volleyball attack practice method was tested to be tested in the field, the researchers conducted a validation or feasibility test of the model to five experts namely volleyball experts / lecturers, physical education lecturers, physical education teachers and volleyball trainers. The five experts assessed the design of the developed model so that it would be worthy to be tested in the field.

Evaluation results are in the form of scores for the criteria for training objectives, training facilities, implementation of exercises and pictures of the attack training model for high school students using the Guttman 1-0 scale. The scores and criteria used are as follows: (1) a score of 0 if the answer given is "inappropriate"; (2) a score of 1 if the answer given is "reasonable".

Next the researchers present the results of data from each expert involved in this study.

Table 3. Summary of Expert Evaluation Results

No	Learning Model	X_I	X_2	X_3	X_4	X_5	amount	%	Criteria
1	Learning model 1 "Hitting the Line"	1	1	1	1	1	5	100	feasible

2	Learning model 2 "Hitting the line from setter"	1	0	1	0	1	3	60	feasible
3	learning model 3 "Down Ball"	1	1	1	0	1	4	80	feasible
4	Learning model 4 "Down Ball from Setter"	1	1	1	1	1	5	100	feasible
5	learning model 5 "Jump Hop"	1	1	1	1	1	5	100	feasible
6	learning model 6 "Full Approach Jump Hop"	1	1	1	1	1	5	100	feasible
7	Learning model 7 "Jump Hop from Setter"	1	1	1	0	1	4	80	feasible
8	learning model 8 "Jump & Toss"	1	1	1	1	1	5	100	feasible
9	Learning model 9 "Jump & Toss from Setter"	1	0	1	0	1	3	60	feasible
10	Learning model 10 "1 Step Approach"	1	1	1	1	1	5	100	feasible
11	Learning model 11 "Full Step Approach"	1	1	1	1	1	5	100	feasible
12	Learning model 12 "Clap Rhythm"	1	1	1	1	1	5	100	feasible
13	Learning model 13 "Step Over line"	1	1	1	1	0	4	80	feasible
14	Learning model 14 "Shadow Spike"	1	1	1	1	1	5	100	feasible
15	learning model 15 "Jump Cone"	0	1	1	1	0	3	60	feasible
16	Learning model 16 "Volley Heading"	0	1	1	1	0	3	60	feasible
17	Learning model 17 "Wall Spike"	1	1	1	1	1	5	100	feasible
18	learning model 18 "Jump & Touch"	1	1	1	1	0	4	80	feasible
19	learning model 19 "Jump Tip"	1	1	1	1	1	5	100	feasible
20	Learning model 20 "Jump Tip from Setter"	1	1	1	0	0	3	60	feasible
21	Learning model 21 "Shoot Ball"	1	1	1	0	0	3	60	feasible
22	Learning model 22 "Short Ball"	1	1	1	0	0	3	60	feasible
23	Learning model 23 "Long Ball"	1	1	1	1	1	5	100	feasible

Notes:

a. X_1 : Dosen Ahli Bola voli I
b. X_2 : Dosen Ahli Bola voli II
c. X_3 : Dosen Ahli Media Latihan
d. X_4 : Dosen Pendidikan Olahraga
e. X_5 : Pelatih Bola Voli

Based on the results of the feasibility test model of the attack exercise conducted on a model of 23 contained in the table above. Obtained an outcome score of 97 from a maximum score of 115 or with an average percentage of the results of using the model at 87.05% so that the overall use of the model in this development can be categorized as feasible and suitable for use in the development of a attack training model. Based on data collected from each expert consisting of 5 experts, there are still several product designs that need to be revised before small group trials and large group trials are conducted. Product revision is intended to make the product design developed more perfect. The following is a summary of product revisions based on the following recommendations from experts:

1. Sort the model based on the level of difficulty, starting from the easiest to the difficult.
2. The use of tools must be in accordance with needs, the equipment listed in writing the model is only what is really needed.
3. Prioritize the easiest exercise model by using a ball so that it can be immediately applied in the game.
4. Model attack exercise 1 Implementation of the subject when doing hand positions do not bend should be straight to get the highest range.
5. The attack exercise model 6. Keep your hand position straight and keep swinging from the bottom up.
6. Attack 11 training model so that automation occurs, when the subject starts smoothly, then footprint images are not needed anymore.
7. The volleyball attack training model, the picture is quite interesting but more clarified about the boundary distances.
8. The attack practice model should not only move on hand, the off hand should also be done.
9. The attack 13 training model was changed because the emphasis at the start of the attack was a step, not a jump, and using the cone as a reference to repulsion was too high, then it was enough to just line it as a reference.
10. The attack practice model 18 the height of the ball that is hung is adjusted to the jump range of the student.
11. Attack 22 and 23 Exercise Model Students who act as throwers must be thoroughly considered, so that the ball that is thrown can be attacked properly.
12. Attack practice model 22 height of the ball is adjusted again, not too high.

Model Effectiveness

The level of effectiveness of the training model design developed in this study was obtained from the results of small group trials, large group trials and the effectiveness of the model by giving treatment to the developed training model and seeing the results of the training obtained by students. The results of the trials are the basis for researchers to determine that the effective exercise model developed is used in the volleyball attack training process. Following will be presented data from each trial.

Limited Field Test Results

Limited Field Test will obtain data about the ease and attractiveness of the volleyball attack training model in volleyball theory and practice. Trial subjects in a small group trial of 12 students were taken at random. Data taken by giving instrument in the form of questionnaire. After the data is obtained then the average percentage of results is calculated from the number of answers obtained from filling out the questionnaire.

Table 4. Results of Limited Field Test Data Analysis

No	Variable	Result Score	Maximum Score	%	Explanation
1	Feasibility	664	816	81,37	Very Good
2	Attractiveness	678	816	83,09	Very Good

Based on the table above the ease of the volleyball attack training model obtained a value of 81.37% and declared good. Based on the attractiveness of the volleyball attack training model, a value of 83.09% was obtained and it was declared very good. The results of the analysis of the Limited Field Test data in the table above for students can be concluded that the volleyball attack training model can proceed to the Final Product Revision Test with some notes including: 1) the use of the facilities in the attack training model must be revised because it is felt difficult to be done by students, 2) the frequency of movement of each training model is increased, 3) the distance between teams on the group training model is adjusted to the field.

Final Product Revision

After the final product revision is complete then the product is experimented to find out the effectiveness of the product development. Test the effectiveness of this product using the design of one group pretest-posttest design, namely by conducting a pretest or initial test and conducting a posttest or final test for the experimental group. To find out the effectiveness of the product development of the volleyball attack training model for students using the average difference test.

Table 6. Difference Tests in the Effectiveness of the Attack Exercise Model

N	df	t-value	t-table α = 0,05	Result
35	34	13,22	1,697	Rejected

Notes:
Df: degree of freedom
t-value: t-value
t-tabel: t-table at significance value α (0,05)

Based on the data analysis obtained t_0 of 13,22 and t_{tabel} 1,697 with df 34 and $\alpha = 0,05$. Thus, $t_0 = 13,22 > t_{tabel} = 1,697$ or H_0 is rejected. Therefore, H_1 is accepted, there is a difference between the volleyball spike results of the students after being given the volleyball spike learning model on the initial test and the final test.

Discussion

The final result of the product development of the volleyball attack training model after research is in the form of scientific articles about the development of the volleyball attack training model. Development of volleyball attack training models in volleyball theory and practice courses based on needs analysis at school. The results from the needs analysis show that:

1. The lecturer has taught several techniques in volleyball, but the variation of the attack technique is not yet optimal.
2. Attack technique material is taught to students in lectures.
3. The means used in volleyball training are still limited to the net, cones and volleyball.
4. Teachers still use the monotonous volleyball training model only by training in groups and pairs.
5. Students are enthusiastic in participating in the attack technique training but because the training model is less varied, so students get bored quickly just playing in the field.
6. Teachers have tried their best to provide attack material so that students are more interested in learning attack, but due to lack of existing training model sources, it is difficult for teachers to add a reference to the attack motion training that will be given.
7. In general, lecturers or instructors are in need of various kinds of varied attack-motion training models, especially with the inclusion of training models that are adjusted from simple movements to complex movements.

After analyzing the needs of the attack training model, it is very important that the researcher makes 23 models with a two-method approach namely the part and whole method which is then submitted to 5 experts to be asked to validate the model that the researcher arranged. Based on the results of the feasibility test model of the attack exercise conducted on a model of 23 contained in the table above. Obtained an outcome score of 97 from a maximum score of 115 or with an average percentage of the results of the use of the model at 84.35% so that the overall use of the model in this development can be categorized as feasible and suitable for use in developing a attack training model.

Based on the results of limited field tests obtained data as follows. From the limited field test results obtained criteria results reviewed aspects of the ease of the volleyball attack training model obtained a value of 81.37% and declared very good. Whereas in terms of the attractiveness aspects of the volleyball attack training model, the value was 83.09 and was stated to be very good.

Limited field test results have a positive value, the researchers proceed to the Feasibility Test (Final Product Revision) involving 35 subjects, to see the effectiveness of 23 models developed and applied to students, the results obtained show a t0 of 13.22 and a table of 1.697 with 34 degrees of freedom and $\alpha = 0.05$. Therefore, t0 = 13.22> t table = 1.697 or H0 is rejected. Because H0 is rejected then H1 is accepted, so it can be concluded that there is a difference between the results of volleyball attack students after being given a volleyball attack practice model on the initial test and the final test.

The volleyball attack training model developed by researchers has advantages:

1. This training model is arranged with a simple to complex movement design.
2. The frequency and intensity of movements of each exercise model is adjusted to the characteristics of high school students.
3. Presenting an active, effective and efficient exercise model and can be done by all students who have already gotten basic volleyball game techniques.
4. Students are more active in the training process.
5. The tools used are safe for students and are easy to get.

While the weakness of the volleyball attack training model developed by researchers has a weakness that requires time in preparing the training tool before practicing.

Conclusion

In the model development research, the product produced was a volleyball attack training method with a part and whole method. Based on data collected from research results consisting of expert validation, limited field tests and feasibility tests and discussion of research results, the researcher can draw conclusions that:

1. Needs analysis results show that the attack training method is needed by students and lecturers. Based on 23 volleyball attack training methods developed by researchers, validation results from 5 experts obtained a score of 97 results from a maximum score of 115 or with an average percentage of the results of the use of the model at 84.35% so that the overall use of the models in this development can be categorized feasible and

suitable for use in the development of attack training methods. The results of limited field tests obtained criteria results reviewed aspects of the ease of volleyball attack training methods obtained a value of 81.37% and declared very good, while the attractiveness aspect obtained a value of 83.09% and declared very good

2. The effectiveness of the developed model is declared effective for use through the model feasibility test. Based on the results of the comparison between the pretest and posttest scores given to students the results obtained t0 of 13.22 and table 1.697. Therefore, t0 = 13.22> t table = 1.697 or H0 is rejected. So, it can be concluded that there is a difference between the results of passing under volleyball to students, after being given a volleyball attack training model and is effective for improving volleyball attack skills.

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