

The Development of the 2020 Multifunction DA Plyometric Wicket Tool for Central Java PPLDP Athletes.

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Abstract

Today, the development of various sports in Indonesia is quite fast. Sport cannot be separated from the training process. Sports require physical and technical training in order to create qualified athletes. However, the availability of facilities and infrastructure, especially training aids, is still left behind, especially for plyometric training. The tools used are still not practical to use. Based on the above, it is necessary to develop products for assistive devices that can facilitate both athletes and coaches to practice and maximize their abilities. The purpose of this research is to produce a multifunction of DA 2020 plyometric goal that can be used to train athletes in various sports at PPLDP Central Java. This research is a development research, as for product development procedures, namely, conducting a needs analysis that will be developed and obtained from the results of a literature review, observation and interviews, developing an initial product draft, expert validation, improvement of the initial product draft, small-scale trial, first product revision, product revisions based on the results of expert evaluation and small-scale trials, field trials, final product revisions based on field trials, the final result is the 2020 Multifunction DA Plyometric Goal media for plyometric jumping exercises for athletes at PPLDP Central Java. The instruments used in this study were questionnaires, observations, interviews and documentation. Through this research, evaluation data of athlete trainers and product appraisal experts were obtained with an average percentage of 89% and meets the "Very Good" criteria. While the small-scale trial data obtained a percentage of 84% and field trials of 87%, thus meeting the "Very Good" criteria. From these data, it can be concluded that the 2020 Multifunction DA Plyometric Goals media is effective to be used as a medium for athletes plyometric jump training at PPLD Central Java.

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INTRODUCTION

Sport is necessary for human life anytime and anywhere. Modern life now cause people to be aware of the importance of sports. This awareness affects the development of knowledge and interest in sports more quickly, not only as a hobby, but also as a spectacle, recreation, fitness, health and livelihood (Patelr, 2014).

Sport cannot be separated from the training process. Basically, sport is a form of sport that requires a combination of physical and technical components. Internal physical components include; coordination, speed, flexibility, accuracy, agility, power, endurance, stamina and high physical fitness, thus, the training process to realize an athlete who excels in sports must optimally combine physical and technical components (Hidayah, 2011).

There are many factors needed in the coaching process for sports achievements. A good sports coaching process is if it is supported by adequate equipment and infrastructure. Effective training methods, effective training programs, effective talent scouting processes, evaluation or assessment of training results, sufficient funds, the ability of coaches, good management and organization (Rihtiana, 2014:217).

Thomas Fahey (2012) suggests that most people believe that athletes' strengths are born and not made. Now that view has changed, with the right and integrated handling of physical condition programs can make athletes or people stronger and faster in any sport, however, the achievement of increasing strength depends on each individual.

According to Chu (2008) that the secret behind this success lies in the method of training carried out "Coaches and athletes understand that plyometrics are exercises or tests that aim to connect strength and speed to produce power". This term is often used in connection with repetitive jumping movements or exercises stretch reflex to produce an explosive reaction. In line with this opinion (Darojaformancet, 2019) in (Santosa, 2016) power is the a eof thbility of muscles to overcome resistance with very fast contractions. Plyometric exercises are exercises

that allow muscles to achieve maximum strength in the shortest possible time (Chu, 2008: 2).

Plyometric training is an exercise method that can be used to improve the biomotor freshness of athletes, including strength and speed which has very wide applications in sports activities. According to Slimani (2016) Plyometric exercises include the strength and speed used for muscle contraction in the explosive movement characteristics of the Stretch Shorten Cycle (SSC). This type of exercise includes dynamic SSC movement to improve the athlete's movement with short period results over time. Plyometric training is an exercise method for developing explosive power, an essential component of most muscle performances. Today plyometrics refers to exercises that involve very strong muscle contractions in response to fast dynamic loads and involve stretching of muscles (Hanafi, 2010).

Many factors affect the results of athletes' training, one of which is the creativity of the coach in making and developing tools for training (Donie, 2017). Equipment is an important means of exercising. The smooth development of athletes can be measured by the availability of sports equipment. Adequate sports equipment will reflect the quality of the coaching carried out, so that the coaching objectives will be achieved properly. Conversely, inadequate tools will have an impact on the low quality of coaching, so that it cannot produce the highest achievement. Lack of sports equipment has an impact on training activities that become ineffective, efficient, and tiring.

Currently, the development of various sports in Indonesia is quite fast, as is the case in Semarang. However, this is not followed by the optimal use of sports science and technology, especially in the use of training aids, especially for plyometric trainings.

The coach must have several standart; low, medium and high, despite in reality each athletes have different capability to perform the hurdles. in addition, the tool is considered less practical because most sports in PPLPD Central Java. Based on these problems the trainer needs to design a tool that can be used on the field. To overcome these obstacles. One of them is the plyometric wicket. This tool is expected to make it

easier for both coaches and athletes to carry out more effective and practical exercises so that it can increase the performance of the athletes.

Exercise tools are very important in sports activities because the majority of sports activities are activities that prioritize body movement. (Zhannisa, 2015). Tools can be used as a media to carry out exercises for athletes in carrying out such trainings. Currently, the availability of assistive devices as a media for sports training is still rare, trainers generally still use thick bent wire or plastic materials that are ready-made in various sizes from low, medium and high to train plyometrics. As stated by Suresh and Vithal (2016) that sports facilities are very important for athletes and coaches, it can increase motivation for coaches and athletes. Therefore, sports facilities should not be ignored. Researcher hopes to be able to unite plyometric goal tool of several sizes into a multifunction and can be used for several forms of plyometric training.

From the design of this tool, it is expected that the results of its development can be used in coaching programs, especially in mass programs, nursery programs, and also coaching programs achievements in various sports for the Central Java Regional Student Development and Training Center (PPLPD Central Java).

Training that use the 2020 Multifunction DA Plyometric Goal is expected to improve the athlete's vertical jump ability and strengthen the athlete's muscles, especially the lower body muscles such as the legs. In addition, the tools were also created by researchers to be concise and practical to use and carry for the training process. By using this product, it is hoped that it will make it easier and also increase the enthusiasm and motivation of coaches and also athletes.

The purpose of this research is 1) to design a multifunction of DA 2020 plyometric goal development so that it can be used in practice . 2) Knowing the development design which can be used in several sports.

METHOD

This research is a development research, as for product development procedures, namely, 1)

needs analysis 2) initial product draft, 3) expert validation, 4) improvement of initial product draft, 5) small-scale trial, 6) first product revision, product revision based on results of expert evaluation and small-scale trials, 7) field trials, 8) final product revisions based on field trials, 9) Final products. The data used are in the form of quantitative and qualitative data. Qualitative data obtained from observations, interviews and questionnaires in the form of criticism and suggestions from experts and athletes both orally and in writing as input for product revision materials. The analysis technique used is descriptive analysis of percentages. While quantitative data were obtained from the numbers given in the questionnaire by experts and athletes. The data analysis technique used is the percentage to analyze and assess the developer subject in assessing the level of feasibility, quality, and product acceptability (Arikunto, 2006).

In processing data the percentage is obtained by the formula from Ali (2013: 201), that is :

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

Information:

% = Value in percent to be searched

f = Value obtained

N = Sum of all values

From the percentage result that is obtained then classified to get the data conclusions. In the table below, the percentage classification will be presented:

Table 1. Presentage Classification

Presentage	Classification Meaning	Throw away
0 – 20	Very Less	
21 – 40	Less	Repaired
41 – 60	Enough	Used (conditional)
61 – 80	Good	Used
81 – 100	Very good	Used

RESULTS AND DISCUSSION

The results of the research have obtained the final product in the form of an effective tool used

as a plyometric jump training tool for athletes in PPLDP Central Java. The product produced in this research is a portable product with the name DA 2020 Multipurpose Plyometric Goal which can be made easily and cheap.

The 2020 Multifunction DA Plyometric Goal is a modification of sports facilities in the form of a tool to use for plyometric jumping exercises. This product can be used for training to maximize vertical jump ability and lower body muscle strength. The DA 2020 Multipurpose Plyometric Goal Product is a tool that is portable and can be disassembled, making it easier for the training process anywhere. This product can be used for plyometric jumping exercises in general, such as one foot one-foot hurdles, two-foot single-wicket jump, 1-foot all hurdles jump, side-to-side stepping (1 hurdles 1 foot), side jump 2 feet, jump 1 hurdle 2 feet (forward then backward), jump 1 hurdle 2 feet, and jump then slide right, jump then slide left and so on. In addition, this product is useful for athletes' agility and reaction when passing the goal.

Product specifications of the DA 2020 Multifunction Plyometric Goal, which has a height of 50 cm and a width of 50 cm. The main material used is galvalume iron which has a lighter weight than the ordinary iron. Products are portable so that it can be disassembled for easy mobility and storage when the product is not in use.



Figure 1. Product Image (Source: Research Documentation, 2022)

The 2020 Multifunction DA Plyometric Goal is an exercise tool to perform plyometric exercises to improve vertical jump abilities. The name DA is taken from the author's initials, namely Dwi Anditya, while the number 2020 is the year when the idea to create a development tool was found. Below are some important parts of the 2020 Multifunction DA Plyometric Goal.

The leveling hole is a part of the 2020 DA Plyometric Goal which functions to adjust the height of the goal. Leveling hole if interpreted in Indonesian is the level of the hole. This section consists of 9 holes which are then locked using a simple key so that the height can be adjusted depending on the level of practice that will be given. The higher the level of the hole applied, the more difficult the level of difficulty of the exercise given.

This lock serves to tighten and loosen the hinge of the goal. The lock is used to tighten the hinge of the goal when it is used for practice so that the goal will stand firm and strong even if it is hit by an athlete who fails to jump, and vice versa if the goal has been used or is not used, this lock will be loosened so that the hinge of the goal will be easy to fold and compact to carry anywhere so that it can facilitate the training process whenever and wherever you are.

This connecting pipe serves to connect the support part of the goal with the crossbar section used for obstacle jumping in plyometric jumping exercises, this connector is made of inch L pipe which is then attached to the crossbar section used for obstacles in performing plyometric jumping exercises.

The crossbar is an equally important part of this product. This bar is used as an obstacle in making jumps, this bar is connected to a connecting pipe so that when used this bar can also be used as a handle when carrying a goal or used to grip when raising or lowering the height of the goal. This crossbar is made of galvalume pipe with a diameter of 1/2 cm.

The 2020 Multifunction DA Plyometric Wicket product has a good level of practicality and mobility so that it will increase effectiveness and efficiency when used for training. The DA 2020 Multipurpose Plyometric Wicket Product is a tool

used for plyometric jumping exercises. For several sports, many still use manual plyometric wickets to perform plyometric jumping exercises. The existing plyometric wicket equipment is not yet flexible, the coach or athlete who will carry out the exercise must have several sizes low, medium and high, even though the reality on the field is that athletes' abilities vary in doing these hurdles.

How to use the DA 2020 Multipurpose Plyometric Goal product for plyometric jumping training, namely,

Removing the Lock, the first thing to do to use the DA 2020 Multipurpose Plyometric Goal product is to open the lock on the stand, unlock it by turning it to the left.

Separating the support poles from the base, after loosening the lock, the goal is to separate the support poles from the base to be able to straighten the supports used as a place to attach the bars. You do this by holding each part of the support pole and base, and pulling the part of the support pole outwards.

After the stanchion and base have been successfully separated, then stretch the stanchion to the desired maximum angle, then tighten the locking portion again to prevent the strut from falling and causing the strut to not stand up properly.

Combine the Support Pole with the Cross, After the support part tightened the lock and stood perfectly at an angle of 90o, the next step is to combine the support posts with the crossbar, the way is to insert the bottom of the crossbar between the two right and left holes that are already available at the top of the support post, insert the bottom part of the crossbar into the the maximum point of the strut that can be firmly attached.

Setting the Leveling Hole, Leveling hole or level hole is a part that serves to raise or lower the support pole. The goal is to be able to adjust to the athlete's ability. How to use the leveling hole is to press the button in the form of a button on the leveling hole, then pull the top part of the support pole and adjust it to your training needs. After that the pole is ready to be used for practice.

The 2020 DA Plyometric Goals Products Multifunction if it is compared to similar

products on the market has several advantages, including: 1) The price of making DA 2020 Plyometric Goals is cheaper than conventional wickets on the market. 2) The materials that are used for the manufacture of the 2020 Multifunction DA Plyometric Goals products use galvalume iron which is stronger and lighter than ordinary iron, the selection of these materials is to make it easier for the product to be carried so that it makes the training process easier. 3) Develop training methods so that trainees are not bored and monotonous. 4) The DA 2020 Multifunction Plyometric Goal Product can be adjusted the height of the goal so that it can adjust to the athlete's ability. 5) Then for the level of flexibility, this product has a good level of flexibility, because this product can be folded so that it will be easier to carry and not take up a lot of space for storage.

The data obtained from filling out questionnaires by expert trainers and product assessment experts, is a guideline to state whether the 2020 Multipurpose DA Plyometric Gawang product can be used for small-scale trials and large-scale trials. Game experts consist of coaches for several sports at PPLDP Central Java, while product assessment experts consist of lecturers from the Faculty of Sports from a leading State University, Semarang State University. Aspects of the questionnaire given to experts are design aspects, specifications and quality aspects and the last one is the usability aspect. (Sugiyono, 2015:419), The following are the results of filling out questionnaires from expert trainers and product appraisal experts.

Table 2. Expert Assessment Analysis

No	Expert	%	Classification
1	Sport Coach Expert	81	Very good
2	Product Expert	91	Very good
Average		89	Very good

Looking at the table of assessment analysis from the experts through filling out questionnaires conducted by experts, the average percentage of trainers in each sport is 87% which is categorized as "Very Good", the percentage result from product assessment experts is 91% which is categorized as "Very Good". Well". From these

results obtained an average of 89% which is categorized as "Very Good" it can be concluded that the development media for the 2020 DA plyometric goal to improve the vertical jump ability of athletes in PPLDP Central Java can be used for small-scale trials.

A small-scale trial was conducted with the research subjects, that are 15 athletes from various sports in PPLDP Central Java. The aspect studied in the small-scale trial was the effectiveness of the product with training carried out by observation, besides that a questionnaire was also given to be able to assess the product from aspects of design, specifications and quality as well as usability (Kusuma, 2015: 130).

The implementation of a small-scale trial with 15 athletes responding to PPLDP Central Java on the 2020 Multipurpose DA Plyometric Gawang product, the results of observations on skills with several training techniques provided include:

Stepping and running 1 Goal 1 Leg, this exercise starts from standing relaxed, head and body upright. The arms release downwards to compensate for the movement of the legs, and one leg is bent. Then immediately make a quick jump one foot forward.

Jump 1 Goal 2 Legs, Same as the previous exercise, this exercise starts with standing relaxed, head and body upright. The arms release downwards to compensate for the movement of the legs, and one leg is bent.

Jump All Goals 1 Leg This exercise uses leg strength to be able to jump over the goal, position your body behind the goal, then when you hear the signal start jumping over all the goal using one foot.

Stepping Sideways (1 Goal 1 Leg) In this exercise the body position is sideways next to the goal. The body position is upright with a sideways position. When you hear the signal, start jumping on one leg with your body still sideways.

Side jump with 2 legs Just like the side jump exercise using 1 leg, the body position is sideways when jumping, but when jumping the athlete uses both legs to jump.

Jump 1 Goal 2 Legs, Forward Then Backward Position the body facing the goal, body

position and head straight with hands still relaxed. When he hears the signal, the athlete jumps forward using both feet, then proceeds to jump back using both feet. 7) Side Jump 1 Goal 2 Legs In this exercise the body position is sideways next to the goal. The body position is upright with a sideways position. When you hear the signal, start jumping on one leg with your body still sideways.

Jump Then Slide Right, Jump Then Slide Left and So on in this exercise, which combines exercises for defense in basketball, slides are one form of exercise for those in basketball. The body position is bent and the feet are shoulder-width apart, then the legs are bent to a half-squat. In this exercise, slide to the right then jump over the goal, do the opposite to the left. Of the several training methods provided, all athletes who take part in the plyometric jump training process using the DA 2020 Multipurpose Plyometric Gawang product can perform jumping exercises according to the instructions given by the trainer. Athletes who perform exercises are able to undergo the given training process without experiencing significant difficulties.

Meanwhile, to obtain data for product assessment, a questionnaire was given containing several aspects including Design, Specifications and Quality and Usability. The results of the data analysis of the product assessment questionnaire by athletes obtained the following percentages:

Table 3. Small Scale Athlete Assessment

No	Aspect	%	Classification
1	Design	83	Very good
2	Specification and Qualification	84	Very good
3	Uses	87	Very good
	Average	84	Very good

The implementation of a small-scale trial of the DA 2020 Multifunction Plyometric Goal product can be carried out well, but there are several obstacles that prevent the 2020 Multifunction DA Plyometric Goal product from being used optimally. The following are the obstacles that emerged after the 2020 DA Plyometric Goal product was tested on a small scale, namely the material is too heavy, the use of

material with a diameter that is too small, and the use of too many bolts. From these constraints, revisions were made to increase the effectiveness of the product, namely by increasing the change in product materials with lightweight but still strong materials, increasing the diameter of the material used in the product and reducing the number of bolts used.

After making improvements to the existing obstacles in small-scale trials, then large-scale trials were carried out with 88 athletes from a number of sports in PPLDP Central Java as respondents and the following results were obtained.

Table 4. Large Scale Athlete Assessment Analysis

No	Aspect	%	Classification
1	Design	85	Very good
2	Specification and Qualification	87	Very good
3	Uses	89	Very good
Average		87	Very good

From the results of data analysis on the questionnaire given to PPLD Central Java athletes, 85% data was obtained for the design aspect so that it was included in the very good category, 87% for the specification and quality aspects and included in the very good category and the usability aspect obtained a score of 89% and received the predicate very good. The average obtained for all aspects is 87%, this result is an increase of 3% from small-scale trials.

Through research and revisions that have been carried out based on the evaluation of basketball game experts, product assessment experts, small-scale trials and large-scale trials of junior high school basketball extracurricular participants, the development product can be obtained in the form of Effective Multifunction Reflective Strap for basic technical training for basketball extracurricular participants. So that the product is feasible to be used for basic technical training for basketball extracurricular participants.

CONCLUSION

This research resulted a product that is a tool of a plyometric jump training aid for athletes in

various sports at PPLDP Central Javathat is the DA 2020 Multifunction Plyometric Goal. The DA 2020 Multifunction Plyometric Goal Product is effective for improving the plyometric jump training of athletes at PPLDP Central Java which is indicated by the "Very good" criteria based on the results of the validity test of basketball game experts and product assessment experts, small-scale trials, and large-scale trials, so that the product The 2020 Multifunction DA Plyometric Goal can be used by athletes at PPLD Central Java. It is expected that this media development model can be used as an alternative in creating and practicing athlete training programs in various sports, not only in PPLDP Central Java but also all athletes in Indonesia.

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