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Development model of volleyball spike training

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Abstract
The purpose of this study was to produce a model of spike volleyball practice. This study was developed based on the basic theory of volleyball spike taken from varieties of relevant sources. The model is derived from the theory of learning model proposed by Borg and Gall. In addition, this model was also developed based on empirical data from relevant research, those are the research on the spike volleyball skills conducted by Mulyana (2004) and research on the development of the model by Emral (2013). Data taken based on the results of a questionnaire answered by the expert coaching, volleyball coach, and expert learning media. In addition, tests are also conducted to the control group and the experimental group. Data validation and revision of the results processed to determine the feasibility and effectiveness of the models developed. Test results in the control group and experimental groups were analyzed by t-test to determine whether the model developed is effective or not.Based on the validation of the volleyball experts, instructional media expert and trainer, this product of spike volleyball models can be used by various groups, especially volleyball clubs in order to improve the skills and spike competency. The effectiveness of the model also demonstrated by t-test results that show a positive significance.The result shows that the model is effective and very proper to use. Therefore, spike volleyball training model can be considered to be the main model for the implementation of spike training. Furthermore, this model has implications for improving volleyball achievement both at the regional, national and international.

Keywords: Taining model, volley ball

Introduction

Sport as a physical activity promises its own benefits for the culprit, namely the achievement of the intensity of physical fitness and even spiritual freshness. This is consistent with the slogan *men sana in corpore sano*, in a healthy body there is a strong soul. In the Indonesian community, sport in general has become a necessity of life itself. Exercise is believed to provide the freshness of the body, which means that provide health care for the culprit. Sports activities take place based on their physical fitness and spiritual needs, which in practice may take the form of recreational sporting activities and sporting achievements.

Among the various types of sports, volleyball is a sport that indicate compliance recreational purposes and at the same achievement. This sport has its own place in society, because it's cheap and easy to do. In general, people play volleyball for the purpose of pleasure, and executed when the time owned. Usually people playing volleyball in the afternoon after praying Asar, about 3 hours until 5 o'clock. The time will be wasted three hours and do not achieve any fitness if left to pass. Then playing volleyball relatively cheap and easy as it is feasible to do as a pastime.

At various international events, Indonesia tries to exist through volleyball. On the events of Southeast Asia and Asia, Indonesia's volleyball team participates in it, not only to participate, but also to be champion. Either for the purpose of participatory and to be champion, a volleyball team should be supported by reliable players who have optimal performance, both in the service, passing, spike or blocking. Those are related to the mastery of play volleyball skills. When playing volleyball aims to acquire achievements, so the play should be done seriously and takes good coordination of movement of each player. To create a good coordination and cooperation through a combination of techniques, each team needs to practice organization team in accordance with the tactics and strategy.

One of the basic skills must be mastered by volleyball players is spike. The lack of understanding and mastery of spike is may be one of the obstacles why Indonesia's volleyball team has not been able to talk much at international level.

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This fact is recognized, because the achievement of Indonesia's national volleyball team lack of consistency.

Say so, because achievement chart of Indonesia's national volleyball team sometimes up and sometimes down, even dropped altogether. Worst experience was when the volleyball team in South East Asia could not able to pass the preliminary round.

Spike practice model becomes problems alternative that arise to study further. The need phenomenon of volleyball spike practice models in accordance with the club's achievements both at the local, regional, and national levels, was found after the writer saw the development of football clubs. So far, the volleyball clubs in Indonesia have not shown an optimal development, so it affects the achievement expected. One of the obstacles are found is the weakness of spike skill.

Theoretical Study
Understanding of Development
Development is an attempt to improve the technical skills, theoretical, conceptual and morale of employees in accordance with the needs of the job / position through education [1]. In this connection, Sikula defines development as follows: "The development refers to the problem of staff and personnel is a long-term educational process using a systematic and organized procedure by which managers learn conceptual and theoretical knowledge for general purposes".

In general, the development has a sense of growth, change slowly, and gradually change. Seels & Richey in Hariyoko said that the development means the process of producing learning materials [2]. While the function and application development is one form or relevant research model and can always be used in education. This research model is used to overcome the gap between basic research and applied research [3]. Gaps were found usually between the results of basic research that is both theoretical and applied research results that are practical. Research and development is the research model used to address these gaps.

Definition of Model
According to wikipedia Indonesian model is a plan, representations, or descriptions that describe an object, system, or of accuracy is 53.8% for long pass, 74.6% for medium pass and 60. or descriptions that describe an object, system, or a concept, which is often the simplification or idealization. The shape can be either physical models (mock-ups, prototype form), the model of image (drawings, computer images), or mathematical formula [4]. The model is something real and converted to a form that is more comprehensive. For example, an airplane model made of wood, plastic, and glue as real models of aircraft [5].
Madaus and Kellaghan citing the model definition of the Oxford English Dictionary as follows, that the model is "... a summary, epitome, or abstract of the way a particular one conceptualizes and describes ..." [6] Model is a summary or abstract of the way or the concept of a person against something.

Definition of Volleyball Spike Exercise
Exercise is a process of activities undertaken to improve a skill or physical condition. Tangkudung and Pusporini [7] mention "Exercise is an iterative process and increased in order to improve potential to achieve maximum performance." According to Suharno training is a process of preparing a child's physical and mental training systematically to achieve optimal quality achievement with a given load regular exercise, directed, increased and repetitive time [8]. According Harsono main goals and objectives of the exercise or training is to improve the skills and achievements of athletes optimally [9].

Bompa & Haff mentions that "Training is a process by the which an athlete is prepared for the highest level of performance possible." [10] Exercise is a process in which the athlete is prepared to achieve the highest possible level of performance. This last description states that a high level of performance of an athlete is the purpose of the exercise done.

Harsono said that the exercise or training is a systematic process of training or work, which is done repeatedly, with increasingly add to the amount of training load or work [11]. There are any keywords on Harsono's to note, that the systematic and repetitive.

Through systematically practice and constant repetition, the neurophysiological organization will get batter, movements that previously difficult to do in the long run will be the automatic movements and reflective.

Based on the above understanding can be concluded that the practice is a process that is done repeatedly and systematically to improve the skills and physical condition of athletes in order to achieve optimal performance.

Definition of Spike
Spike is hitting the ball hard from top to bottom and dived into the opposite field. Spike or Smasher is a form of attack that is most widely used in an attempt to score by a team. Punch spike many kinds and variations [12].

Sarumpaet *et al.* stated, "Spike or hard spike is a hard blow attack" [13]. To be able to spike, the hand and the ball must be on the top of the net, so that the ball can be directed steep downward.

Barbara and Bonnie mentions that there are three methods that determine the effectiveness of a spike [14]. These three methods, among others, spike with a tip, namely the attack patterns can simply tip the ball by not employ harsh but

[1] http://developmentcountry.blogspot.com/2009/12/definisi-pengembangan.html (accessed November, 1, 2013).

[2] Hariyoko. *Pengembangan Model Pembelajaran Keterampilan Dasar Sepakbola PesertaEkstrakurikuler Sepak Bola SMP Negeri di Kota Malang.* (Jakarta, UNJ.2012).h.11.

[3] Emral, *Pengembangan Model Latihan Keterampilan Teknik Dasar Bermain Sepakbola Siswa SSB PSTS Tabing Padang.* (Jakarta : Program Pascasarjana UNJ, 2013). h.12

[4] Wikipedia.org. Diakses Senin, 4 Nopember 2013.

[5] Trianto. *Mendesain Model Pembelajaran Inovatif Progresif.* (Jakarta : Kencana, 2011).h.21.

[6] George F. Madaus and Thomas Kellaghan. *Models, Metaphors, and Definition in Evaluation. Dalam buku Evaluation Models Veiwpoints on Educational and Human Services Evaluation.* (Boston : Kluwer Academic Publishers. 2002).h. 20.

[7] James Tangkudung & Wahyuningtyas Pusporini, *Kepelatihan Olahraga "Pembinaan Prestasi Olahraga, Edisi II.* (Jakarta, Penerbit Cerdas Jaya, 2012).h. 7

[8] Suharno, *Dasar-dasar Permainan Bola Volley.* (Yogyakarta: IKIP Yogyakarta, 1980). h.3.

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[12] Nuril Ahmadi. *Panduan Olahraga Bola Voli.*(Solo: Era Pustaka Utama, 2007).h.31.

[13] A. Sarumpaet. dkk. *Permainan Besar.* (Jakarta: Departemen Pendidikan dan Kebudayaan. Direktorat Jenderal Pendidikan Tinggi Proyek Pembinaan Tenaga Kependidikan, 1992).h.99.

[14] Barbara L. Viera & Bonnie Jill. *Bola Voli Tingkat Pemula.* Terjemahan oleh Moti (Jakarta : Raja Graphindo persada, 1996).h.95.

effective enough to kill the opponent. Tip is usually done when a player that wants to see any spike very tightly blocking attempts by opponents. Rather than banging the ball into the hands of estab-blocking and ball bounce back to him, then the tip will be able to trick the opponent, and the ball fell safe in the area the opponent. The second method is slow spike with character. The player does not use a great power, but puts the ball into the empty opponents territory but difficult to reach. The third method is a hard spike, which in a game this becomes an interesting spectacle.

Relevant Research

This development of volleyball spike practice is empirically done based on relevant research. Among other is the research conducted by Mulyana (20014) on the relationship eksplosive power, kinesthetic, and coordination with the skills of volleyball spike. This study has similarities to focus the discussion of research development Spike Volleyball Training Model which basically focused on the problem of how a player is able to improve the skills of the spike through the training process is based on a model developed. The difference lies in the subsequent discussion domain, because research Development Model Spike Training Volleyball eksplosive not about power, kinesthetic, and coordination of eyes, hands, and feet as the research conducted by Mulyana.

Other relevant research related to the development of the model proposed by previous researchers, namely Emral which examines the development of basic engineering skills training models playing football. Emral (2013) research focus lies on how a product is produced through a process pengemgbangan models of models that already exists. Equality between research Emral with Development Model Spike Training Volleyball course lies in the focus of the discussion of the models are developed. If Emral take measures according to the model development Borg and Gall, the researchers also developed a model of examples of the same model but with a different projections. The difference lies in the object of his research, which is a discussing about football while others discuss about volleyball.

Model Concept Developed

To generate a spike volleyball practice models (model Adi Indra Budiman) writers take the theory of the development of the model proposed by Borg and Gall with the following steps: (1) Research and gathering initial information. This first step includes research and information gathering through literature study, observation subjects, preparation of reports point. This first step is essential to obtain preliminary information on the subject to be developed. In this case, the observation of the condition, abilities, and skills of volleyball athletes, so that researchers can then take steps to modeling exercises beginning spike targeted. (2) The planning, which includes defining the skills, and the formulation of specific objectives. Product development will be done well if special purposes has been determined. Careful planning will determine seamlessly to the implementation of the test in the next step, (3) development of the initial product formats include the preparation of teaching materials, preparation of handbooks and evaluation equipment. Printed material that contains or business process procedure in this case is needed, equipped with video as visualization training measures spike a volleyball. (4) Initial tests, carried out in small groups involving several subjects and data, including the results of interviews, observations, and questionnaires. The data was collected and analyzed. The trial was conducted on the format of the program, tested on compliance with specific objectives

outlined. (5) Product Revision I, (6) field trial, carried out the group with a larger number of trials early. Quantitative data obtained were collected and analyzed in accordance with the needs of specific objectives. (7) Revision II products. (8) Test field, involving subjects more than the previous field tests. In the field tests is equipped with interview, observation and questionnaire delivery. The results are then analyzed. (9) Revision of the final product, (10) Dissemination and Implementation, carried out in the form of a report on the development. In it includes processes, procedures, programs, and products [15].

Methods

Research models spike exercise is a process that aims to formulate and develop training models using the methods of research and development (Research and Development). Training models adapted from the model Borg and Gall.

Step-by-step development of volleyball spike practice models depicted in the groove below.
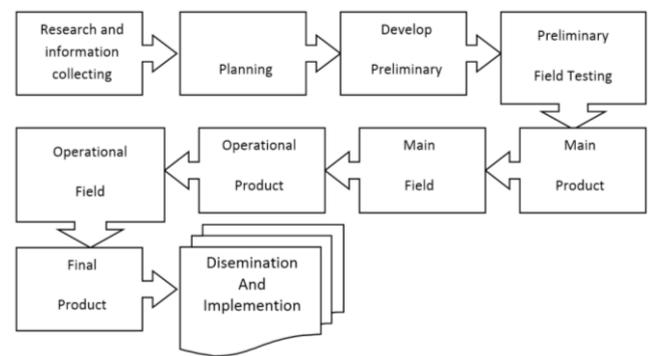
Fig 1: Research Steps of Development Model of Spike Training Volleyball

The research steps above taken to obtain data that is then reviewed and analyzed. The collected data is analyzed and then presented to be made the next planning. Any data obtained were analyzed through quantitative descriptive analysis of the percentage, as the excess of the developed model representations. Whereas to determine the effectiveness of the model, t-test is used to represent how effective the development models generated, by testing a model for the control group and the experimental group.

Data analysis techniques in this study using a hypothesis test with correlated sample t test. The decision to accept or reject the hypothesis at the 5% significance level, to analyze the data used SPSS 17.0 for Windows Evaluation Version.

Hypothesis test is used to determine the effectiveness of the models developed. Hypothesis test conducted with two sample t-test correlated, using SPSS 17.0 for Windows Evaluation Version. If the decision-making criteria hit $t > t$ table and $p < 0.05$, then Ho is rejected and Ha accepted, meaning the development of training models spike volleyball effective and fit for use.

Results

Volleyball spike exercise model applied to a number of samples that have been determined, supported by the validation of several parties, among others, from media experts, referees, volleyball expert, and athletes. The trial was designed to produce a model of effective training and decent spike used for similar exercises in other places by the other

[15]Borg W.R. & Gall M.D., *Education Research an Introduction.*(New York : Longman, 1983),.h.775.

party as well.

Preliminary study of the form of the data presented and analyzed according to the analysis needs through observations made in the field with the object of research a number of athlete's volleyball. Validation is done with the distribution of questionnaires to three media experts, three volleyball coach, and three volleyball referee. Meanwhile, the volleyball athletes be tested for 18 (twelve) the control group and 18 in the experimental group.

Table 1: Data Preliminary Study Results

No.	Komponen Preliminary Study	Findings
1.	Library Study	• The basic technique spike Volleyball • Model developed training consists of a hierarchical arrangement since physical exercise (heating and moderate exercise) to practice techniques (individual and group). • The basic technique spike combined with physical strength and biomechanical elements will generate spike blow accurate and on target. Physical strength consists of a maximum height of achievement when jumping and a hard blow when the ball floating in the air. • Basic engineering skills spike volleyball using complementary equipment (media) allows varied exercise, easily analyzed through direct observation. • During this exercise has not been done in a programmed,
2.	Interview	• Not available models specific exercises that can be used as a reference or guide by coach, especially in the case of spike volleyball, • Frequent straight games without heating or initial training, • Not to do specific exercises to spike a volleyball, • Mistakes made by the players both during training and games, are not corrected immediately by the coach, is left until then forgotten altogether for repair, • Based on observations in the field for 30 minutes of exercise effect ratio is obtained an error rate during a volleyball spike: 1) when the prefix 35%, 2) when jumping 40%, 3) while hitting 70%, and 4) during landing 60%. • Principles of practice that should exist in practice volleyball spike is not executed properly.
3.	Need Analizy (Observed on January 2013)	• Model volleyball spike exercise very urgent to be developed in connection with the scarcity of training models that are written specifically for the benefit of exercise spike. • Product models spike volleyball practice is very likely to be developed • Human resources that have the skills, knowledge and experience to develop products reasonably available to the quantity and quality trustworthy • The time required for product development is quite a lot.

The next step is the preparation of a draft or draft volleyball spike practice models based on the results of the analysis of the needs and conditions of coaching.

Focus Group Discussion (FGD) is the next step that aims to determine how far the draft model developed acceptable nor measured validity. Volleyball training experts give validity as undescribed in table 2 below.

Table 2: Results Validation Expert Training Volleyball

1.	Validation of Expert	
	Results validation of volleyball training experts (n = 3) in March 2013	• Three expert volleyball coach gives validity to the results of the evaluation of 91.33%. These results indicate that the model practice volleyball spike extremely fit for use. • Third volleyball training experts advise that this kind of exercise portion should be coupled with a number of groups or group more so that all players or more athletes have the opportunity to try. Thus, each participant may perform repeated movement spike with more frequency. According to the coach, motion pictures should be distinguished from one another more contrast, for example, provided images of different color. • In addition, given also the notes about the use of media load legs, back load and spring board. According to training experts, media as effective enough to provide strength on certain things, but it should be added to allow the amount of ingredients used by all athletes during training • Input from other coaches is to provide an opportunity for athletes to play in the field of simulation before the actual playing field, for example in the field of volleyball mini. With a small-sized field of players can get used to doing spike and land the ball in the right place.

Validation of media exports and volleyball coach is the next step after the revision of the product III.

Table 3 below describes the results.

Table 3: Results Validation Expert Media Learning / training and coach Volleyball

| 1. | Validation of media experts (n = 3) in July 2013, the instrument as much as 50 rounds of questions. | • According to media experts spike volleyball practice models developed very decent to wear. This conclusion was stated after the effect obtained ratio of 87.62%.
• Mechanical shooting according to media experts still harud trimmed, because foikus sometimes specific to the object in question. Still no image blur and not related to image. Although the lack of it does not interfere with the overall, but improvements need to be done. |

2.	Validation of volleyball coach (n = 3) at the end of July 2013	• Ratio effect derived from the results of the validation of volleyball coach is 86.17%. Conclusions were appropriate for this result is that the model of training is very feasible to use. • Development of physical training, technical training and joint exercises (games) needs to be developed further.

Data validation results volleyball training experts to spike volleyball practice models presented in Table 4.4 below.

Table 4: Data Validation Results Volleyball Training Expert N = 3

No.	Training model draft according to….	Minimal Score	Maximal Score	Result Score	Persentage
1.	Volleyball training epert 1	50	200	178	89,00
2.	Volleyball training epert 2	50	200	172	86,00
3.	Volleyball training epert 3	50	200	198	99,00
	Average				91,33

In Table 4 above in mind the average percentage of expert validation training volleyball is 91.33%. Validation of training experts note obtained as follows: (1) that the spike volleyball practice by combining physical exercise wear portion of the load must be coupled with a number of groups or group more so that all players or more athletes have the opportunity to try. Thus, each participant may perform repeated movement spike with more frequency. According to the coach, motion pictures should be distinguished from one another more contrast, for example, provided images of different color, (2) provide an opportunity for athletes to play in the field of simulation before the actual playing field, for example in the field of volleyball mini. With a small-sized field of players can get used to doing spike and land the ball in the right place.

The design of the spike volleyball practice models developed also with media include video as a visual guide.

Validation of learning media experts provide evaluation of the effect ratio results as listed in Table 5 below.

Table 5: Media Expert Data Validation Study Results N = 3

No	Learning media according to…	Minimal Score	Maksimal Score	Result Score	Persen-tage
1.	Learning Media Experts 1	35	140	123	87,90
2.	Learning Media Experts 2	35	140	119	85,00
3.	Learning Media Experts 3	35	140	126	90,00
	Average				87,62

Table 5 shows the results of a media expert validation learning / training amounted to 87.62%. Media expert in validation provides some advices:

1. Mechanical shooting according to media experts still should be trimmed, because the focus is sometimes not specific to the object in question.
2. There is no image blur and not related to the topic.
3. Despite the lack of it does not interfere with the overall, but improvements need to be done Results of the validation of the models volleyball coach volleyball spike exercise is as shown in table 6 below.

Table 6: Data Validation Results of Volleyball Coach N = 3

No.	Training model product according to…	Minimal Score	Maksimal Score	Result Score	Persen-tage
1.	Volleyball coach 1	50	200	174	87,00
2.	Volleyball coach 2	50	200	164	82,00
3.	Volleyball coach 3	50	200	179	89,50
	Average				86,17

Effect ratio derived from the data validation results volleyball coach amounted to 86.17%.

Meanwhile, the suggestions put forward by the coach that the development of physical training, technical training and joint exercises (games) need to be repackaged to produce a more perfect.

Test Results Control Group and Experimental Group through calculation SPSS 17.0 for Windows is known that the test results in the control group received an average of 17:11 with the amount of data 18, standard deviation and standard error 1.32349 0.31195 means. While the amount of data 18 in the experimental group gained an average of 23.3889, with a standard deviation of 1.03690 and 0.24440 menasnya standard error.

The above data also recorded a correlation value of 0.076 with 0.764 significance. This means that there is a strong correlation between the test group and the control group test scores experimental approaches 1.

The above t-test was made to determine whether there are differences in test scores between the control group and the experimental group. Tests using a significance level of 0.05.

Discussion

Based on the data analysis of the validation results obtained can be seen feasibility spike volleyball practice models developed. Validation volleyball training experts, instructional media experts, and coaches coupled with the test results become the basis of a conclusion whether to spike a volleyball practice models feasible or not to wear.

Percentage analysis of data from three experts of volleyball training is 99.33%. It can be concluded that the model of spike volleyball practice is extremely fit for use. Meanwhile, the percentage of media expert validation of the models spike volleyball practice amounted to 87.62%. With these results we can conclude that the model of spike volleyball practice very feasible to be used. While data validation results volleyball coach drawn by national qualifications, the percentage of validation coach to spike a volleyball practice

models amounted to 86.17%. With these results we can conclude that the model of spike volleyball practice very decent to wear.

Furthermore, data from the test results to a control group and an experimental group with t-test were analyzed as follows. The formulation of the hypothesis is Ho: There is no difference in average scores between the control group with the experimental group, and Ha: There is a difference in average scores between the control and experimental groups. Of output is known that the t value and significance is -15.286 0.000 and t table in the statistics table on the significance of the 0.05-2 = 0.025 with a degree of freedom (df) n-1 or 18-1 = 17 results for the t table is equal to -2.458. The test criteria is if t table ≤ t ≤ t table, then Ho is accepted, whereas if t count <t or t count> t table, then Ho is rejected.

From the results obtained is known that the value t <t table (-15.286 <-2.458) and significance <0.05 (0.000 <0.05), then Ho is rejected. So it can be concluded that there are significant differences between the test scores of control group and experimental groups. From the calculation of SPSS 17.0 for Windows test experimental group was higher than the control group test results.

Thus the model of spike volleyball practice very feasible to be used.

Conclusion
Based on the validation of the experts, the training experts, instructional media expert and trainer, product models spike volleyball drills that can be used by various groups, especially volleyball clubs in order to improve the skills and abilities of the player's spike.

Dimensional models envisaged achievement of objectives, quality, variety and systematic material deemed very decent for a model of spike volleyball practice. Dimensions significantly above illustrate the accuracy and effectiveness of the model, which implicitly given its opinion by training experts and trainers. Meanwhile, media expert learning / training provides reinforcement that the models developed by the video of this model is very feasible in the light of image quality, sound quality, and the quality of the music. Any video models presented deemed to have fulfilled the functions from the point aternal psychological, affective, cognitive, imagination and motivation. In addition, video sociocultural models have met the criteria so it is worth also be used to provide a visual overview spike volleyball practice in terms of social and cultural angles.

Through empirical evidence, spike volleyball practice models have a good effectiveness. Small group trial and field test showed that the model of spike volleyball has a material with a significant level of convenience, varied, appropriate and beneficial. In addition, the method used is quite effective and has an appeal.

Implications
The conclusion above shows that the model of volleyball spike exercise effective and very proper to use. Therefore, models spike a volleyball practice it can be considered to be the main model for the organization of training spike. Furthermore, this model has implications for improving achievement volleyball both at the regional, national and international.

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