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Development of Badminton Smash Learning Model in High School

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ABSTRACT

The background of this research is that a badminton smash learning model has not been applied so that during the learning process students tend to be less motivated. The general purpose of this research is to make a product in the form of a badminton smash learning model for high school students, so that it becomes more effective and interesting. The specific objectives of this study were (a) to develop a badminton smash learning model for high school students, and (b) to collect empirical data on the results and effectiveness of the badminton smash learning model. This study is a type of research and development (R&D) with reference to the Borg and Gall design which consists of Research and Information Collecting, Planning, Development of The Preliminary of Product, Preliminary Field Testing, Operational Field Testing, Operational Product Revision, Main Field Testing, Main Product Revision, Final Product Revision, Dissemination and implementation. Data were collected through interviews and questionnaires; data analysis was done through quantitative descriptive analysis. The results showed a badminton smash learning model consisting of four models that are considered feasible and effective to be applied to badminton smash learning for high school students.

INTRODUCTION

Currently, the most widely conducted type of research is development research or commonly known as research and development because of the importance of developing science to make learning easier to do. (Putra et al., 2020). Development can be classified into two categories: educational and non-educational. This research is differentiated based on the topic of the research conducted (Ardiyanto & Fajaruddin, 2019). Research and development is a term used to describe activities related to the creation or discovery of new, models, and products or services using new knowledge discovered to meet market needs or field needs.

Physical education programs are very effective in helping students understand and appreciate the value of kindness as a way to achieve the greatest productivity, effectiveness, and happiness as individuals. (Ansori et al., 2023).. Physical education is one of the most important aspects in producing quality human resources. (Syafruddin & Herman, 2021). Physical education is a term that officially

refers to learning through sports and physical activity. It includes lessons about health and fitness, from basic exercises to yoga, gymnastics, and even learning how to manage athletic games. (Mustafa, 2022).

Badminton is one of the skills in hitting shuttlecocks and receiving shuttlecocks, using equipment in the form of batting rackets, balls, and natural field nets as playing equipment. (Ishak et al., 2022). This game can be played by two people individually or four people in doubles (Gunawan et al., 2023). Badminton games have the aim of landing the shuttlecock into the opponent's playing area and vice versa. Badminton games require the cooperation of a pair (in the doubles sector) which must be supported by good physical and technical skills and players who have qualified basic techniques are more likely to be able to play badminton as desired.

Researchers' observations in the field, mastery of basic smash skills in badminton games is still low and the lack of motivation of students is due to several factors, such as students not being given a smash skill learning model, training that is always monotonous and there are not many variations carried out during the learning process of badminton smash skills, and students' lack of understanding of the importance of mastering effective and efficient smash skills.

Badminton smash technique is considered a technique that is quite complicated to teach, especially physical education teachers who do not have a badminton background specifically, and there are even some schools whose physical education teachers do not come from the scope of sports education. Therefore, through the development of a badminton smash learning model in high school, it is hoped that it can produce a product in the form of a smash skill learning model for high school students, so that it becomes more effective, and interesting in the implementation of the learning process.

The basic techniques that must be mastered in playing badminton are holding a racket, footstep patterns, lower strokes (netting and serving) and upper strokes (lob, chop, dropshot and smash). The various basic techniques of hitting in badminton games are long serve, short serve, lob, smash, drop shot chope, drive and netting. (Nurbait et al., 2020). Badminton games have attack and defense patterns which in practice are adjusted to the strategy that will be applied during the match and can be used in singles and doubles, male and female players. (Zhao & Gu, 2019). A badminton player or pair cannot rely on defensive patterns alone but really needs a good and efficient attack contribution.

The goal of the badminton game is to score more points than the opponent by forming a good attack and the portion is adjusted to the game strategy to be applied. Badminton players need qualified smash skills to attack and turn off the opponent's defense and score points. The role of smash in badminton is very important because smash skills must be understood, learned and mastered by badminton players.

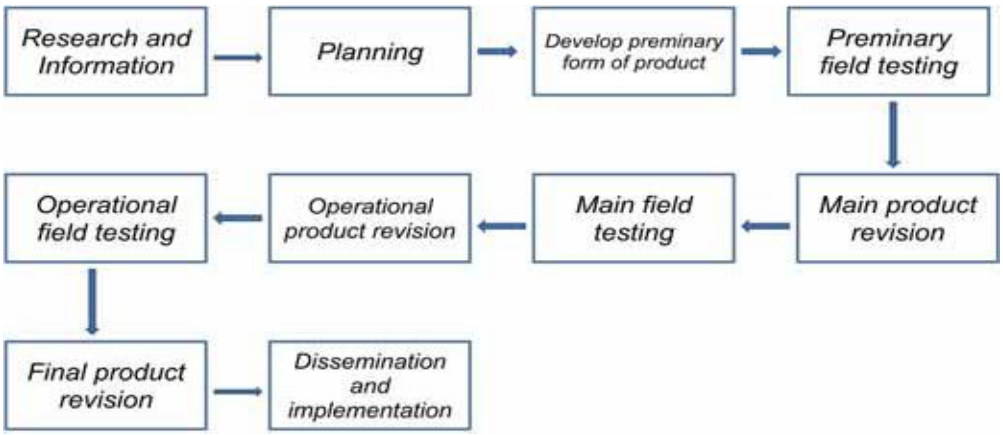
Smash skills can be mastered with systematic and continuous practice and to increase the effectiveness of the attack. (Hu et al., 2022; Marchena-Rodriguez et al., 2020; Pardiwala et al., 2020).. The series of movements to produce an accurate smash shot are body position, waist rotation, shuttlecock contact, hand swing and followthrough. (Fattahudin et al., 2022; Gou, 2021; Pangkerego et

al., 2021).. The whole series must be mastered well so that it can produce as many points as possible and open up great opportunities to embrace victory. The smaller the smash success rate, the smaller the chance to win the match and vice versa a large smash success rate will open up opportunities for victory.

Smash is an overhead shot directed downward and performed with full power. (Rusdiana, 2016). This blow is identical to an attacking blow, because its main purpose is to kill the opponent. Smash is a form of hard punch that is often used in badminton games. Smash as part of the basic badminton technique which has high movement difficulty but has an important role when attacking to get points and has a beautiful motion aesthetic. Therefore, physical education teachers need a learning model with the right approach to improve the ability of basic badminton smash skills. (Fattahudin et al., 2022).. From several opinions that have been expressed in this study, researchers will develop a Badminton Smash learning model for high school students.

METHODS

Research on the development of badminton smash learning models in high schools uses the research and development model (Research and Development) from Borg and Gall which consists of ten steps or can also be described in the form of a development stage scheme as shown below:



Model Development Steps:

1. Preliminary Research

   The purpose of conducting a needs analysis is to find out the problems faced in the badminton smash learning process. This can be done by observing Physical Education, Sports and Health learning activities, followed by a literature review.

2. Model Development Planning

   The next step is to create an initial product in the form of a series of model developments that can later be used as guidelines in improving quality and skills. The initial product is outlined in the learning model. The development of the learning model is expected to be a product that can be

developed systematically and logically, so that this product has the effectiveness and efficiency to be used.

3. Model Validation, Revision, and Evaluation

   The making of the badminton smash learning model is complete, so the next step is to evaluate the model. This evaluation is carried out to improve and perfect the learning model that has been made. The next step in research and development of badminton smash learning models is:

   a. Expert Judgement Review

      To improve the shortcomings of the designed badminton smash learning model, three evaluators were asked to provide feedback. The results of the expert evaluation will be used to help the process of improving the badminton smash learning model for high school students.

   b. Small Group Try-Out

      The badminton smash learning model was revised by the expert correctly, so the next step is to introduce and practice the badminton smash learning model. The implementation of small group trials was carried out with a sample of 10-15 high school students. The purpose of this phase I trial was to obtain input and suggestions by identifying and refining the products developed after being reviewed by several experts.

   c. Product Revision

      After the initial product is tested on a small group trial, the next step is to make revisions based on feedback and field notes.

   d. Large Group Test (Field Try-Out)

      The next stage is a large group trial or what is often called a field trial, this is intended to seek input, suggestions and assessments of the product to be developed. In the follow-up activity of research and development of badminton smash learning models is a field trial which is carried out after the learning model is revised from the results of the previous trial.

      Field trials were conducted on class XI students as many as 40 students. The conclusion of the field trial is the final basis for improving and refining the new product of badminton smash learning model. The results of the response from the students after doing the learning directly are given as input for evaluating the improvement of the model development.

   e. Product Revision

      The conclusion of the field trial is the final basis for improving and refining the new product of badminton smash learning model. The results of the response from the players after doing the learning directly are given as input for evaluating the improvement of the model development.

Evaluation at this stage is the final evaluation of the badminton smash learning model, after improvement according to input from the field test, the badminton smash learning model product is considered suitable for distribution or use.

4. Effectiveness Test

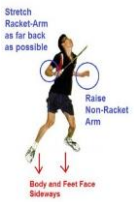
This trial aims to (1) find out whether the model design has been applied properly and correctly by the teacher, and (2) how effective the results of the application of the model are towards the objectives of this study. Thus, a quantitative approach was used to find this effectiveness with a pre-experiment research design in the form of a one group pretest-posttest design.

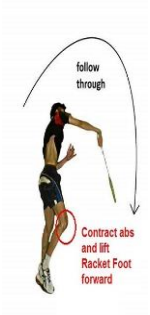
5. Model Implementation

Researchers implement and distribute products that have undergone revisions from experts to players, sports teachers and coaches who can be used as reference materials for training basic skills in playing badminton. This badminton smash learning model can be re-analyzed and refined again as development material.

The instrument used in this study is to measure existing variables. Before doing the test, the testee is given the opportunity to experiment. The following is a badminton smash skill instrument:

Table 1. Smash Assessment Indicators

No.	Smash Assessment Indicator	Sub Indicators	Description	Assessment			
				1	2	3	4
1.	Starting Position 	1. Foot position 2. Waist position 3. Hand position 4. Elbow position 5. Viewing position	1. One foot is in front in a ready position. 2. the waist position is tilted forward. 3. hand position must be loose. 4. elbow position bent 80 degrees. 5. gaze position towards the shuttlecock.	1	2	3	4
2.	Stepping Position and Foot Support 	1. Right foot movement and support position 2. Left foot movement position 3. Right knee movement position 4. Left knee movement position 5. Waist movement position 6. Hand movement position	1. The right foot is the fulcrum and the left foot is in front. 2. The left foot is in front and the right foot is the fulcrum. 3. adjust the movement of the left knee. 4. adjust the movement of the right knee. 5. waist position bends forward. 6. hit from the back of the shuttlecock with a sharp dive 7. elbow movement bends about 80 degrees 8. direction of the punch	1	2	3	4

		7. Elbow movement position 8. ball direction					
3.	Shuttlecock hitting position and follow trough position  	1. Right foot movement and support position 2. Left foot movement position 3. Right knee movement position 4. Left knee movement position 5. Waist movement position 6. Hand movement position 7. Elbow movement position 8. Eye view	1. The right foot is the fulcrum and the left foot is in front. 2. the left foot is in front in a ready position. 3. adjust the movement of the left knee. 4. adjust the movement of the right knee. 5. waist position bends forward. 6. both hands at the sides, one hand still holding the racket. 7. bend 80 degrees. 8. focus on the direction the ball is headed.	1	2	3	4

Assessment guide:

1) Starting position assessment criteria
   a. Score 4 is given if the student performs all movements according to the sub-indicators.
   b. Score 3 is given if students perform 80% of the movements according to the sub-indicators.
   c. Score 2 is given if the student performs 60% of the movements according to the sub-indicators.
   d. Score 1 is given if the student performs 20% of the movements according to the sub-indicators.
2) Stepping position assessment criteria
   a. Score 4 is given if the student performs all movements according to the sub-indicators.
   b. Score 3 is given if students perform 80% of the movements according to the sub-indicators.
   c. Score 2 is given if the student performs 60% of the movements according to the sub-indicators.
   d. Score 1 is given if the student performs 40% of the movements according to the sub-indicators.
3) Criteria for judging the position of hitting the shuttlecock and following through
   a. Score 4 is given if the student performs all movements according to the sub-indicators.
   b. Score 3 is given if students perform 80% of the movements according to the sub-indicators.
   c. Score 2 is given if the student performs 60% of the movements according to the sub-indicators.
   d. Score 1 is given if the student performs 40% of the movements according to the sub-indicators.

RESULTS AND DISCUSSION

Based on the initial needs analysis conducted through interviews with physical education teachers, the following results were obtained: 1) Teachers currently really need a clear reference or guide for learning badminton smash, 2) Teachers strongly agree if there is a book developing a badminton smash learning model for high school students, 3) students do not understand how much influence or how important good smash mastery is, 4) The learning that is done is monotonous and has

not shown several variations of learning so that it makes students feel bored. The initial product of the badminton smash learning model before the small group trial is carried out, it needs to be validated first by experts. The validation process is carried out by providing a draft of the initial product of the badminton smash learning model accompanied by an evaluation sheet for 2 (two) coaches and 1 (one) physical education teacher. Based on the results of the validation test conducted by experts, it is presented in the table as follows:

Table 1. Recapitulation of Validation Test Results of Badminton Smash Learning Model

No.	Model Item	Model Feasibility		Description
		Yes	No	
1	Smash Learning Model 1	Yes		Feasible/Valid
2	Smash Learning Model 2	Yes		Feasible/Valid
3	Smash Learning Model 3	Yes		Feasible/Valid
4	Smash Learning Model 4		No	Not Feasible
5	Smash Learning Model 5	Yes		Feasible/Valid
6	Smash Learning Model 6		No	Not Feasible
7	Smash Learning Model 7		No	Not Feasible

Based on the table above obtained from the results of the expert test, it can be concluded that of the seven smash learning models made, there are 3 models that are declared inappropriate because they do not meet the requirements in accordance with the characteristics of student growth and development and refer more to the form of training models that should be adjusted to the form of learning models. The four models that were declared feasible or valid received the following notes:

1. The visualization form of the model should be clear for easy understanding.
2. The model is packaged in the form of a game.
3. The model implemented must take into account the safety factor of the students.
4. The facilities and infrastructure used must be considered.
5. The distance of the stroke must be adjusted by taking into account the characteristics of high school students.

At the scale/small group test stage conducted with a total of 15 students, the following notes were obtained:

Table 2: Summary of Badminton Smash Learning Model Trial

No.	Model Item	Suggestions and Feedback
1	Smash Learning Model 1	Applicable because it is easy to do.
2	Smash Learning Model 2	This learning model is great and very suitable for high school students.
3	Smash Learning Model 3	This learning model is good and very suitable, but the distance between the throw and the target should not be too far apart.
4	Smash Learning Model 4	Not possible due to focus on the concept of exercise form.
5	Smash Learning Model 5	This learning is suitable for students in addition to practicing smash skills can also improve children's concentration.

6	Smash Learning Model 6	This learning model cannot be used because it is too difficult for high school students.
7	Smash Learning Model 7	This model cannot be applied because the distance when hitting is not accessible to students.

Based on the evaluation of the expert test conducted on the smash skill training model for high school students, the following conclusions can be drawn:

1. Implementation instructions should be made clear and detailed so that they can be easily implemented and understood by students.
2. The distance between the shot and the target should not be too far so that it can be done by students.
3. The use of media as aids in the form of baskets, cones, tables and numbering boards, are materials that are safe for high school students, but can be adjusted and made more through a combination of games.
4. Based on the expert test conducted, it can be concluded that model variations 4, 6, and 7 are learning models that are not suitable for high school students.
5. For the variation of the smash 7 learning model, it is seen that it is still very difficult for high school students to do and is not suitable for children aged 15-17 years.
6. Based on the expert test conducted from 7 exercise variations, 4 exercise variations will be tested at the next stage.

Results of the large-scale test phase

The next activity is After the results of developing smash learning model products for high school students after being tested on a small group scale and have been revised, the next stage is to conduct trials on a large group scale. Field trials were conducted with a total of 40 students. Based on the results of the limited trial (small group trial), the researchers then revised the initial product which obtained 4 items of smash learning models for high school students which will then be used in large groups.

Table 3. Results of Expert Revisions to the Smash Learning Model

No.	Model Item	Suggestions and Feedback
1	Smash Learning Model 1	The learning model is very interesting and can be applied because it is easy to do.
2	Smash Learning Model 2	This learning model is great and very suitable for high school students.
3	Smash Learning Model 3	This learning model is interesting and can be applied
4	Smash Learning Model 4	This learning is suitable for students in addition to practicing smash skills can also improve children's concentration.

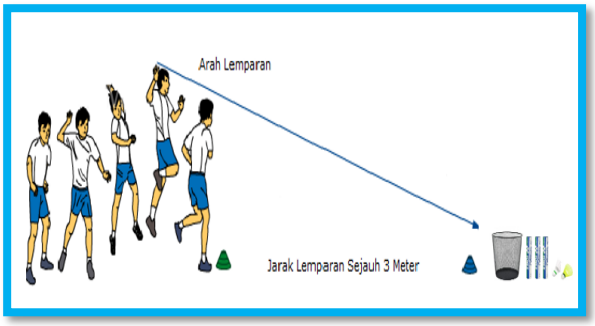
Judging from the results of the field / large-scale trials of the 4 models made, it can be concluded:

1. Overall, all variations of badminton smash learning models for high school students can be done, but what needs to be considered is the order of implementation of each model so that students can do from easy to difficult stages.

2. Given that this large-scale test involves many students, it is necessary to pay attention to all the equipment that will be used so that it can be accommodated and the learning process can run more effectively.

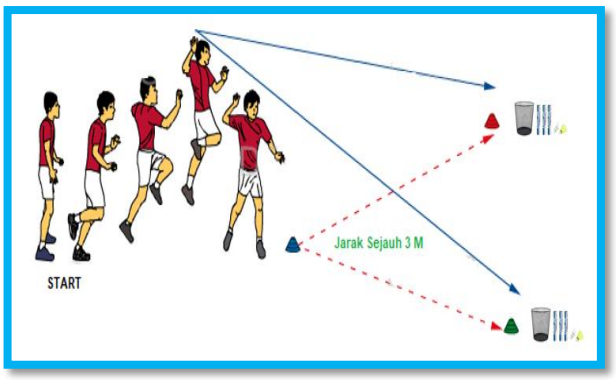
Here are 4 badminton smash learning models that have been developed including:

1. Smash Learning Model Using One Basket



1. The steps of implementation by jumping and throwing the shuttlecock towards the basket.
2. Destination
   a. To teach students the basic movements of the prefix.
3. Facilities and Infrastructure
   a. Badminton court, shuttlecocks, cones, whistle, stopwatch, basket.

2. Smash Learning Model Using Two Baskets



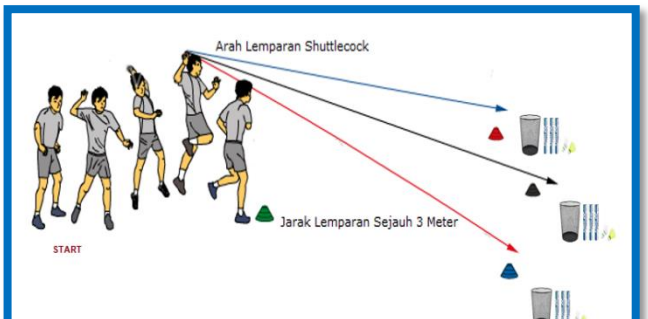
1. The steps of implementation are to jump and throw the shuttlecock towards the basket with the left and right basket positions.
2. Objective:

   To teach students the direction of the punch.

3. Facilities and Infrastructure:

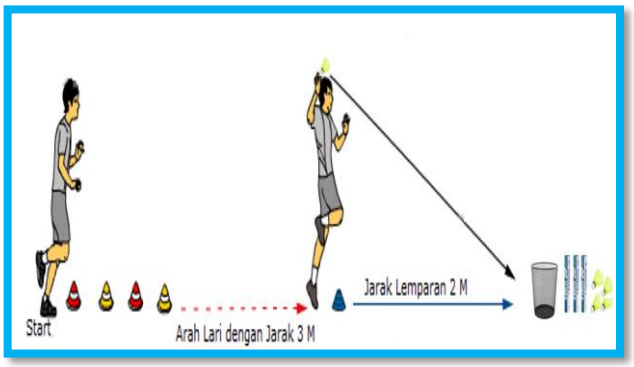
   Badminton court, shuttlecocks, cones, whistle, stopwatch, basket

3. Smash Learning Model Using Three Baskets



1. The steps of implementation by jumping and throwing the shuttlecock towards the basket with the position of the basket on the left, center and right.
2. Objective:
   To teach students the direction of shots with higher difficulty.
3. Facilities and Infrastructure:
   Badminton court, shuttlecocks, cones, whistle, stopwatch, basket

4. Smash Learning Model for Running and Jumping Variations



1. The steps of implementation by jumping and throwing the shuttlecock to the front that has been marked.
2. Destination
   To teach students the accuracy of strokes.
3. Facilities and Infrastructure
   Badminton court, shuttlecocks, cones, whistle, stopwatch.

Effectiveness Test

The next stage after the model received the second stage of revision, it was continued by testing the product on 40 students at SMA Negeri 1 Air Gegas. Then the implementation process was carried out using a pre-experimental research design with a one group pretest-posttest design. To test the effectiveness of the application of the badminton smash learning model for high school students, the "t-test" was used. Before the data is analyzed, a normality test is carried out using the Liliefors test at the real level $\alpha = 0.05$. Assessment data using test instruments that have been provided. From 40 students on the effectiveness of the badminton smash learning model for high school students (SMA) is shown in the following table:

Table 4. Average Value

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Test	7.83	40	1.796	.284
	Post Test	9.65	40	1.494	.236

Based on the output using SPSS 22, the average value of smash learning outcomes before being given a learning model is 7.83 and after being given treatment with a learning model of 9.6. This means that there is a difference in the average value of badminton smash learning outcomes.

Table 5. Correlation Coefficient

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre Test & Post Test	40	.865	.000

Based on the results of the table output above, the correlation coefficient of badminton smash learning results before and after treatment is 0.865 with a p-value of 0.00 <0.05 so it is concluded that there is a significant increase.

Table 6: Significance of Differences

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre Test - Post Test	-1.825	.903	.143	-2.114	-1.536	-12.787	39	.000

In the significant difference test with SPSS 22, the t-count = 12.787 df = 39 and p-value = 0.00 <0.05 based on these calculations that there is a significant difference in the learning outcomes of badminton smash in high school students between before and after treatment. Based on this information, it can be concluded that the badminton smash learning model developed is declared effective and can improve the ability of badminton smash in students.

Based on the data shown in the table above, it can be concluded that the badminton smash learning model for students in high school (SMA) is feasible and effective and can be used to improve the learning process of badminton smash for high school students. There is a comparison of numbers that shows the results of the initial test and the final test have progressed, from the initial test or pretest which amounted to 7.38 then given treatment in the form of badminton smash learning models that have been developed then only the final test or post test is held to determine the effectiveness of the model

developed and the data obtained amounts to 9.65, so the smash learning model is effective for development in the smash learning process of high school students (SMA).

The badminton smash model made by the researcher is a product that aims to help trainers and teachers in delivering badminton smash learning material, improving students' smash skills and also as a reference material for physical education teachers. This is also supported by some of the research results that have been conducted by (Nurbait et al., 2020) which states that the badminton smash model is effective for improving badminton smash ability. (Mangun et al., 2017) also stated that the smash training model in badminton for double athletes that has been developed, can effectively improve skills in badminton. (Ahmad, 2020) also stated that the developed model has been shown to improve badminton smash skills effectively and efficiently in novice athletes.

Looking at some of the research that has been done, the new thing that can be taken in this study is that the researcher developed a smash learning model with a total of 4 learning models which were declared effective to be applied in the badminton smash learning process for high school students.

CONCLUSIONS

From the results of the field test, discussion of the data results obtained from the small group test, large group test, and effectiveness test, as well as discussion of the research results, it can be concluded that: 1. All elements of the smash learning model development can be applied, but must be adjusted systematically from easy to difficult so that students' smash skills improve. 2. The badminton smash learning model is effective in improving the quality of high school students' badminton smash skills.

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