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Development of Learning Model "Chair Grounds Ring" Made from Environmentally Friendly Raw Materials

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Abstract

This study aims to develop a basketball learning model with ring modification. This study uses a development model, using a sample of 350 fifth grade elementary school students in Jayapura City. This research was conducted in April to September 2019. The stages of this research were: 1) Analyzing the product, 2) Developing the product, 3) Expert validation, 4) Field trials, 5) revisions, and product results. The results of the study are: (1) Model game material for basketball chair grounds ring basketball; (2) The effectiveness of the game model can increase student physical activity, this can be seen by increasing the pulse rate before and after participating in learning basketball material. The increase in the average pulse rate of students after treatment increased by 81.7% and the maximum increase in pulse rate by 47.8%; (3) The basketball game model can overcome the limitations of existing facilities and infrastructure. The conclusion of this research is that the use of the product development model of the basketball ring tool can be used as a medium for physical education learning and has an effect on the physical activity of students in elementary school. Suggestions for physical education teachers in elementary schools to be able to use this model in schools in learning basketball games.

How to Cite

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INTRODUCTION

Physical education, sports, and health are part of the curriculum in the form of subjects (Mapel) which are taught in elementary schools (Hanief, & Sugito 2015; Lusianti, 2015). Physical education, sports, and health have a fundamental role to prepare students through physical activity and physical fitness (Kusmiati, 2017). Physical education, sports, and health are divided into three domains: psychomotor, cognitive, and affective (Rizky, & Setiawan, 2016). Industry era 4.0 and K-13 curriculum as it is currently demanding teachers not only as a facilitator, but also has a role as an agent of educational reformers through ideas, adaptive thinking, and creative work. However, this cannot be applied in a straightforward manner according to the curriculum by looking at the conditions supporting the learning tools in Papua. Putra, Triansyah, & Hidasari (2018) as it is known that in large ball material if students are taught basketball it will certainly be constrained in terms of infrastructure, especially basketball hoops made of iron with very expensive costs and cannot adjust the environmental conditions around the school.

Based on observations made by researchers from 1 to 28 February 2019 in ten elementary schools (SD), namely: 1) SD Negeri Inpres 1 East Koya; 2) Abepura State Elementary School 1; 3) Hamadi Elementary School 2; 4) SDO Inpres 1 APO; 5) SD Negeri Inpres Perumnas 1 Waena; 6) Kotaraja Public Elementary School; 7) Kotaraja Inpres State Elementary School; 8) Kotaraja VIM State Inpres Elementary School; 9) SD Negeri 3 Kotaraja; and 10) Ypresfa Inpres Elementary School obtained data including: 1) Large ball game material taught to elementary school students in grade V students feel less enthusiastic, 2) Learning material for basketball games is only taught modestly due to the absence of a basketball hoop, 3) The learning process basketball has not been implemented effectively given the limitations of the facilities namely the constraints of making rings made of iron and permanent with expensive costs.

Based on reference data from the Ministry of Education and Culture (Kemendikbud) in 2019 the number of education units in Papua Province is 2,601 elementary schools / equivalent, 717 junior high schools / equivalent, 254 high schools / equivalent. Specifically for the city of Jayapura there are 103 elementary schools / equivalent, 45 junior high schools / equivalent, 30 high schools / equivalent. If this potential is properly optimized, it can turn Jayapura City into a granary for Papua Province basketball athletes. Then due to the geographical condition of the Papua archipelago, which is mostly forested, the raw material for wood is very easy to obtain and the purchase price is relatively more affordable.

One of the innovations in the development of sports training for beginners and children at the elementary level to solve the complexity of the problem needs to be modified: 1) Basketball rings made from natural wood; 2) Field size; 3) Ball size, and 4) Rules of play. In the design of this study, the authors developed a basketball infrastructure model for the development of a chair grounds ring tool named SR-19 (ball ring equipment developed by Sutoro in 2019) as one of the solutions to overcome the problem of developing basketball for beginners and learning physical education, sports, and health in schools in Jayapura City.

Based on the above background, researchers feel moved to care to develop a tool ring model to support learning basketball which can make children move actively, effectively, efficiently, and can be played in schools that have complete and limited facilities and infrastructure.

METHODS

This research is a research development, where research education and development or research and development (R&D), namely the process used to develop and validate product models (Astuti, Suryaman, & Wiyarno, 2019). There are several reasons given in the development of the basketball game media model, namely: 1) To produce a product in the form of developing a model of infrastructure and game regulations; 2) Operationally this development model produces tools and game manuals that are arranged systematically in accordance with the development research path and procedures.

The subjects in this study were fifth grade children in several elementary schools in Jayapura with the following details:

Table 1. List of Research Subjects

Distrik	Test Location	Subject		Total
		Male	Female	
Kotaraja	SD Negeri Kotaraja	22	33	55
Kotaraja	SD Negeri Inpres Kotaraja	41	31	72
Small scale test		63	64	127
Kotaraja	SD Negeri Inpres VIM Kotaraja	37	45	82

Abe-pura	SD Negeri 3 Kotaraja	30	39	69
Abe-pura	SD Negeri Inpres Yotefa	33	39	72
Wider scale test		100	123	223
Total		163	187	350

Based on **Table 1.** it is known that the product testing in this research design uses three stages to be passed, namely: (1) Pre-survey research, (2) Small-scale test (limited) using 127 students (one district in two elementary schools), (3) The wide-scale test used 223 students (two districts in three elementary schools). The steps and procedures adopted in this study refer to the development research model as proposed by Borg and Gall, and make modifications to the research and development steps in this study. The stages in this research development include:

1. Expert test or Validation, conducted with respondents of experts designing models or products. This activity is carried out to review the initial product, provide input for improvement. This validation process is called Expert Judgment or Delphi Technique (Etale, & Enemugha, 2019).
2. Conceptual analysis.
3. Revision I.
4. Small Group Trials, or Limited trials conducted on small groups as product users.
5. Revision II.
6. Field Testing.
7. Study the Field Test.
8. Revision III.
9. Final Product and Dissemination.

The instruments used in this study are: (1) direct observation (observation), (2) interviews and questionnaires, and (3) document analysis. Researchers use humans as the main instrument, the researchers themselves. The experts and children were given a different questionnaire. The expert questionnaire focused on the first product made, in this case a number of aspects that were assessed for eligibility. The factor used in the questionnaire was the quality of the game model for the modification of the chair grounds ring. As well as general comments and suggestions, if any. The evaluation range starts from "not good" to "very good" by putting a "√" in the column provided as follows:

1 = Not good.
2 = Not good enough.
3 = Good enough.
4 = good.
5 = Very good.

As for the trial process, quantitative analysis is used to see the effect of the development of the model developed based on the results of the pre-test and post-test. Furthermore, data processing is used descriptive analysis techniques in the form of percentages obtained by formulas:

$$Persentae = \frac{n}{N} x100\%$$

Information:

n = Value obtained; N = Sum of all data (Afif, Widianingsih, & Hartati, 2014)

Data analysis uses t-test which is useful to find out the differences or their effects. The formula used is as follows:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} - 2r\left(\frac{s_1}{\sqrt{n_1}}\right) + \left(\frac{s_2}{\sqrt{n_2}}\right)}}$$

Information:

$\overline{X}_1$ = Sample average 1

$\overline{X}_2$ = Sample average 2

s1 = sample standard deviation 1

s2 = standard sample deviation 2

S_1^2 = Sample variance 1

S_2^2 = Sample variance 2

r = Correlation between two groups (Marliani, Hasanuddin, & Nurmaliah, 2017)

The process of determining the interpretation of the results of the percentage analysis of the attractiveness level of product development is used to classify the following percentage criteria:

Table 2. Percentage Classification of Development Product Criteria

Persentase (%)	Classification	Meanings
85-100	Very good	used
75-84	Good	used
65-74	Medium	used
55-64	Poorly	Repaired
10-54	Very little	wasted

(Adapted from Fatmawati, 2016; Hariastuti, & Lukmandono, 2017).

RESULTS AND DISCUSSION

Small Group Trials

A small group trial was conducted at Kotaraja State Elementary School and Kotaraja Inpres State Elementary School, totaling 127 people consisting of: 63 women and 64 men. After using

and doing the game model chair grounds ring made from wood students were given a questionnaire containing an assessment of the product that had been used. This trial aims to examine and identify various problems such as weaknesses, deficiencies, or the effectiveness of the product for use by students. Data obtained from this trial is used as a basis for product revision before it is used in field trials / large group trials. One indicator to determine the effectiveness of the product is to see how much the students are enthusiastic in playing this game and by measuring the students' heart rate. The measurement of the pulse is done before learning the basketball starts and after learning. Through a small trial of the implementation of the basketball game model as Physical Education learning media in elementary schools tested at two schools totaling 127 students, the pulse rate calculation can be obtained as follows:

Table 3. Small Group Trials

Assessment Aspects	Average Number of Small Group Trial Scores	Average	Category
Quality of Learning Model	50,26	3,866	good

Based on **Table 3** shows that the increase in students' pulse rate before learning basketball starts up to after learning by 87%. Then from the statistical results there was a significant change of 0,000. In the implementation of small-scale trials this basketball game can already be carried out well, but there are some things input and suggestions from experts. Various input in the form of suggestions and comments from experts on the product development model of the basketball game as a medium of learning in elementary schools, both related to the facilities and infrastructure of the game, the rules of the game. The following are various suggestions and suggestions from the experts after the product has been tested on a small scale:

a. Instructions and models in providing basic techniques are more varied and clear, so that students can better understand the basic techniques of playing basketball.
b. Instructions in the rules of the game need to be emphasized again, one of them so that students do not flock when playing and all are active.

Large Group Trial

Large group trials were conducted at Kotaraja VIM State Elementary School, Kotaraja State Elementary School 3 and Yotefa State Elementary School as many as 223 students consisting of: 100 men, and 123 women. After using and doing the game model chair grounds ring made from wood students were given a questionnaire containing an assessment of the product that had been used. Then, the data from Table 5. shows that the increase in students' pulse rate before learning basketball starts up to after learning by 85%. Next it can be seen from the statistical results that there was a significant change of 0,000.

Effectiveness of Development Models

Based on validation by basketball experts, data can be obtained to be analyzed and used as a reference for revision. Above from the percentage it can be taken the average percentage to 74.3% which can be taken as a moderate conclusion and can be used.

Assessing the acceptability of products that have been developed.

Student acceptance of product development is also very important, student acceptance can be seen from filling student questionnaires, observations, and simple interviews. The results of research on the level of student acceptance in product development of basketball media models of 323 students viewed from aspects: psychomotor, cognitive and affective results obtained as follows data aspects of student acceptance of product development after being tabulated.

The results of the calculation of student interest and acceptance in the product development of 323 students viewed from aspects: psychomotor, cognitive, and affective, the following results are obtained: (1) 100 students have product acceptance in the "very good" category with the percentage 30.89% which is meaningfully used (2) 191 students have product acceptance in the "good" category with a percentage of 59.1% Meaningful to use (3) 32 students have product acceptance in the "medium" category with a percentage of 9.89% which is meaningful used. Data collection on students' interests / interests in the basketball development model was also obtained from simple interviews and observations. Based on observations and simple interviews, it was found that most students accepted the development of the basketball media model, by looking at the answers that students were willing or

asking to do more learning, also from students' enthusiasm in participating in learning. Based on questionnaire calculation data, the results of interviews and observations can be concluded that students accept the development of the basketball media model.

Based on research that has been carried out regarding the development of the basketball model as a medium for learning Physical education, sports, and health in elementary schools shows a good improvement. The results of this study are relevant to the research of Manalu (2017); Wibowo, & Gani (2018) interesting media can provide motivational encouragement for students in PBM Physical education, sports, and health. Based on the results of students' responses to the psychomotor, cognitive, affective, and basic motion tests of the basketball game after using the basketball model above, it can be concluded that the majority of students have good categories in basketball playing. This is based also on the lack of student responses that fall into the category of lack in all aspects. This is progress in responding to basketball teaching, given that most students only receive basketball teaching at the time of research and with a short time, but already have a good response. Therefore, the basketball media model in general can have a good influence on all aspects. The basketball ring modification model is also very effective for students, because it can increase the pulse rate of students after treatment has increased by 86.88% for small scale and large scale by 84.97%.

Manansang, Rumampuk, & Maningha (2018) physical activity that requires complex routine movements should be measured before and after the activity of the pulse. The increase in pulse rate as an instrument of increasing physical intensity, is influenced by several things that can affect the increase, including: (1) The shape and size and height of the ring which is low and the number is more than one, so students are always active to do the shooting (shooting). (2) Through a field adapted to the composition of students' physical abilities, it will be easier for students to play, provide feedback to teammates and students are not too far away to reach the field in accordance with their body proportions. (3) Through the use of one-on-one defense / games. (4) If students' interest increases because of this convenience, students are enthusiastic about this game so that the pulse rate also increases.

The use of basketball game models for students has had an impact on the increase in students' pulse rate by 87% of 100 students. This is evident from the average pulse rate before participating in learning basketball games by 60 minutes, increasing to 190 minutes after participating in learning basketball games. The results of t-test calculations on the results of the students' pulse counts before participating in learning basketball games and after participating in learning basketball games, showed = 0,000 <0.05 and, so it is evident that the development of the basketball game model had an impact or influence on the increase in pulse rate. Based on the data above, the basketball media model can improve the physical aspects of students involved in physical fitness.

Based on the steps of development research to produce a product that can overcome the limitations of the infrastructure of the basketball game, the final product in the form of a basketball game development model is suitable for elementary school students. Then the questionnaire data, interviews and documentation that have been done show that this modification can be used as a learning tool for basketball games with a modified form of both the basketball ball ring and the field designed in this game. To answer the problem about the limitations of the infrastructure of the basketball game it can be seen from the responses of 2 experts and the response of 1 trainer as the spearhead of learning basketball taken from the questionnaire and the interests and interests of students.

The results of research and development in the form of a basketball ball development model product for learning Physical education, sports, and health in elementary schools have advantages, including: (1) The basketball development model is attractive to students who use it, (2) The basketball development model can be used by teachers Physical education, sports, and health in elementary school, (3) The basketball basketball development model is easy to be played by male and female students, (4) Basketball basketball development model can be played in a place that has a large field or not too large, (5) Model the development of basketball is easy in the provision of facilities and infrastructure, (6) the basketball development model encourages the development of students' skills in playing basketball the size of a standard match, (7) the basketball development model can improve the physical, psychomotor, cognitive, and affective aspects of students..

The product development model of basketball is in addition to having advantages, there are also disadvantages, including: (1) The basketball ball development model uses one ring pole so the old ring vibration to stop, (2) If you do not use variations in competition in learning, the game is not too crowded. The results of this study are in line with research by Wijaya, & Kanca (2019)

modifications in learning are needed to increase students' physical movement activities, making cognitive and affective contributions through interesting game channels. This means that the game is very effective to stimulate student activity in PBM in elementary school which is a time of play for children.

CONCLUSION

Based on the analysis of the results of research and discussion, the following conclusions can be drawn:

The results of the validity of the questionnaire conducted by each expert and teacher of elementary school Physical Education obtained an average of more than 4.4 or included in the category of assessment "good". Effectively the use of chair grounds ring model products for students has an impact or influence on the increase in students' pulse rate after treatment has increased by 86.88% on the small scale and large scale 84.97%. The results of t-test calculations on the results of students' pulse counts before participating in learning basketball games and after participating in learning basketball games, showed □ = 0,000 <0.05, so that it was evident that the development of the basketball game model had an impact or influence on the increase in pulse rate. Based on the data above, the basketball game model can improve the physical aspects of students involved in physical fitness.

Based on the data it can be concluded that the analysis of acceptance is as follows: (1) 127 students have product acceptance in the "very good" category with a percentage of 31% which is meaningfully used (2) 191 students have product acceptance in the "good" category with the percentage 59.1% which is meaningfully used (3) 32 students have product acceptance in the "medium" category with a percentage of 9.9% which is meaningfully used.

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