

Development of a Batting Tool for Learning Physical Education Sports and Health for Students in Elementary School



Muhammad Arifianto¹, Hari Yulianto², Jaka Sayidina Ali³

^{1,2,3} Universitas Negeri Yogyakarta, Yogyakarta, DIY, 55281, Indonesia

ABSTRACT: Research objectives: (1) to generate products for the development of baseball games targeting elementary school students (SD), (2) to assess the viability of developing a baseball game bat for Physical Education learning (PE learning) in elementary students, and (3) to evaluate the effectiveness of a baseball game bat for Physical Education learning (PE) in enhancing the hitting skills of elementary school students. This study was categorized as Research and Development (R&D) or development research, consisted of the following stages: 1) identification of potential and problems; 2) collection of information; 3) design of the product; 4) validation of the product; 5) revision of the product; 6) conducting product trials; 7) further revision of the product; 8) conducting broader trials; and 9) finalizing the model through revision. The trial participants consisted of third grade students from SD Negeri Dalangan 1 (Dalangan 1 Elementary School) in Minggir District. The trials were conducted on a weekly basis. For small-scale trials, there were 6 students involved, and for large-scale trials, there were 12 students. The sample was determined by using purposive sampling. The selected instruments included a questionnaire for material experts and media experts to assess the eligibility of a batting tool as a medium for learning baseball games, as well as questionnaires to gather student assessment responses. The acquired data would thereafter be quantitatively examined by using descriptive statistics, through the calculation of percentages. The acquired results indicate the following: (1) the development of baseball game batting products goes through nine stages of development, and (2) The assessment of the development tool's viability is based on a) the trial validity conducted by material experts shows that the mean value at 4.89 levels of achievement 97.78% are in the "very feasible" category. b) Media specialists undergo validity testing, resulting in an average value of 4.83. The achievement rates for this testing are at 96.67%, placing it in the "very feasible" category. c) A smallscale feasibility trial is conducted. Students receive an average score of 4.62, which corresponds to 87.23% in the "very feasible" category. The large-scale feasibility trials, conducted through a questionnaire, show an average score of 4.95, which corresponds to 99.10% in the "very feasible" category. Additionally, the t-test results indicate that the mean post-test score of 85.42 is significantly higher than the mean pre-test score of 41.67. The rise can be deemed significant based on the statistical significance (2-tailed) with a p-value of 0.000 (less than 0.05). Therefore, the creation of a castle game bat product is highly viable and efficient for teaching Physical Education for elementary school students.

KEYWORDS: *batting tools, development, baseball games, elementary schools.*

I. INTRODUCTION

Khajir (2021, p. 3) explains that the education process can be referred to as school education, where the stages can be taken both through formal (elementary school to university) and informal (family, environment) channels. As for this formal pathway, it includes a variety of subjects delivered to students, including physical education, sports and health (PJOK). PJOK is included as a lesson delivered at all levels of education in order to develop the quality of students, especially in the physical realm, as well as to maintain a healthy life both physically and mentally, to achieve health in the daily lives of students (Komarudin & Prabowo, 2020, p. 57).

Susanto, et al (2022, p. 4-5) explain, the scope of PJOK includes sports and games, gymnastic activities, development activities, water activities, rhythmic activities, and out-of-school education. The sports and games in question include traditional sports, skills, games, manipulative, locomotor and non-locomotor, dynasty, athletics, kippers, rounders, basketball, soccer, table tennis, volleyball, badminton, field tennis, martial arts, and other activities. The various types of games contained in the PJOK material cannot all be organized in schools. The existence of a number of obstacles and obstacles becomes an excuse for not implementing some types of games.

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Based on observations at several elementary schools in Kepanewon Minggir, one of the obstacles and barriers that occur during the PJOK learning process is the unavailability of adequate learning infrastructure, which has a negative impact on the implementation of learning which will also reduce the learning motivation of students in the learning material. Another obstacle or obstacle that occurs is the type of material from the learning carried out by the teacher is still limited, especially the types of game material for elementary school.

Therefore, it is necessary to develop in accordance with the needs and characteristics of the learners themselves which must also be adjusted to their level of growth and development (Wahyuningsari, et al 2022, p. 530) so that the game can optimize the motion experience of students and the game can be used as an effective means of learning PE, especially in elementary schools. An example of game material that can be implemented and given to elementary school students based on basic competencies is small ball games, especially the type of baseball material.

Baseball is a game that is carried out in teams using bats and small balls in an open field, the goal of which is to obtain the highest possible value (Pamungkas, 2015, p. 10). This game is easy to implement, but in its implementation, if the material is not delivered optimally by the teacher, it will certainly support the boredom of the students who take part in the learning process and cause difficulties from the students. Students when carrying out practical activities such as based on observations in the learning process of baseball games, many of the students experience difficulties when hitting, so that the majority of students are not interested in baseball game material, and have baseball game material scores below the Minimum Completeness Criteria (KKM), especially at Dalangan 1 Minggir Elementary School.

The boredom and difficulty of students in hitting based on observations is based on the batting tool used, where the batting tool used during the learning process of the baseball game has a very small cross section, unattractive colors, and the length of the bat handle is too long, making it difficult for students when carrying out batting practices (the bat rarely hits the ball). Therefore, the development of a batting tool can be an alternative to help students easily hit, as well as increase their confidence when participating in the learning process of baseball (valuable experience).

Efforts to develop a batting tool also need to adjust the characteristics, needs, and growth rates of students, besides that the development of tools made must focus on paying attention to the safety and comfort factors of students. The development of a batting tool must at least also refer to the content of educational goals in order to maximize all domains or domains of education to be achieved or developed, namely affection, cognition, and psychomotor of students.

The development of a baseball bat that can later be used by students is expected to be an alternative form of problem solving from activities carried out during the PJOK learning process. The hope of the development carried out can at least increase the interest of students, can overcome the boredom of students during the learning process, and can improve the skills and intensity of movement activities of students when taking PJOK lessons.

In connection with the above problems, it is necessary to develop equipment so that what was originally difficult can be simplified and changed to be easy without the need to eliminate the meaning of what the teacher conveys or teaches. In addition, the development of a baseball bat will increase the innovativeness of a teacher who can support students to be more interested, actively participate, and move in PJOK lessons. The study of the development of a baseball bat will be presented and harmonized with the characteristics, needs, level of development and growth of elementary school students which of course cannot be separated from the comfort and safety factors.

The implementation of the development of a baseball bat will be presented by changing the size of the hitting field which is larger than the previous size, shortening the length of the handle of the batting tool, providing holes in the cross section so that students find it easier to find out the hitting point, as well as providing materials and coloring that are more attractive to students. Development supports the creation of a baseball bat that has good feasibility and effectiveness in optimizing the PJOK learning process, especially in elementary schools. Through the gaps and realities above, researchers are interested in conducting a study with the title "Development of a Batting Tool for Physical Education, Sports and Health Learning for Students in Elementary Schools".

II. METHOD

Type of Research

This research is a development research or Research and Development (R&D). The development model used in this research is the Borg and Gall model. The results of this study are specifically to develop a learning media product for batting tools in a baseball game.

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Time and Place of Research

This research was conducted at SD Dalangan 1 Minggir, whose address is Parakan Kulon, Sendangsari, Kapanewon Minggir, Sleman Regency, Yogyakarta 55562. The time of organizing the research was in April 2023.

Trial Subjects

The test subjects in this study were third grade students of SD Negeri Dalangan 1 Minggir with 6 students for small group test subjects and 12 students for large group trials. The technique used in taking subjects in this study was purposive sampling.

Development Procedure

The development research procedure uses the Borg and Gall model in Sugiyono (2013, p. 298), which includes: 1) potential and problems; 2) collecting information; 3) model development; 4) model validation; 5) model revision; 6. model validation; 5) model revision; 6) model trial; 7) model revision; 8) wider trial; and 9) final model revision.

Operational Definition of Variables

This research is a development research, this research develops a batting tool for the game of baseball. Tool development is a step that is carried out in designing and preparing carefully to develop, produce, and validate a media or tool (Palmizal, & Diana, 2020, p. 7). Then, the batting tool for the baseball game can be called a bat, which is in the form of a bat that is made using wood. In this study, the batting tool for baseball will be modified in order to create a development product that can support the learning of baseball games at school and can make a solution to the quality problems of students in carrying out baseball game learning, especially in carrying out basic techniques in the form of hitting.

Data, Instruments, and Data Collection Techniques

The data collection techniques used in this study were observation and interviews. Observation is used by researchers to understand and observe the means of learning the game of baseball in the research location. Meanwhile, interviews are used to obtain the necessary information in a direct way regarding the completeness of the learning facilities for the baseball game.

The instruments used in this study are a questionnaire for the feasibility of a batting tool and a questionnaire for students' assessment responses to the development of a batting tool for the game of baseball as a learning medium. The questionnaire uses a Likert scale.

Data Analysis Technique

Data analysis techniques in this study are qualitative and quantitative descriptive techniques with percentages. As for the qualitative type obtained through the implementation of interviews and suggestions given by experts. Meanwhile, the quantitative type is obtained through the acquisition of a questionnaire.

III. RESEARCH RESULT

A. Initial Product Development Results

Product design in this case is intended to make a product "batting tool for baseball". The design of the batting tool is made with a wider size, giving color interest, and changing the handle material on the bat which is more attractive and safe. Researchers make batting tool development products to be tested on media and material experts, so that they have the feasibility to be tested in small and large scale groups. The basic material of the bat is light wood (teak wood). The bat is painted using natural colors and the handle is coated with rubber. The bat is made with an overall length of 40 cm with a flat cross section at the top for ball contact, which is 30 cm long, 6.5 cm wide, 3 cm thick, while the bottom for the handle is 10 cm long, 2.5 cm wide, and 3 cm thick. The weight of the batting tool weighs 0.340 g. The product design of the development of a batting tool for the dynasty game in question, namely:



Figure 1 Initial Product Development Results

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B. Product Validation Results

The development of this batting tool must pass validation and trials, where for material validation is carried out by material expert lecturers, while for media validation is carried out by media expert lecturers.

1. Material Expert Validation

Validation from material experts was carried out in the lecturer's room of Dr. Drs. Amat Komari, M.Si on December 20, 2023. The data obtained through this material expert validation can be presented with:

Table 1 Material Expert Validation Results

No	Aspects Assessed	Sum of scores	Mean	Achievement Level	Category
1	Physical	30	5	100%	Very feasible
2	Design	29	4,83	96,67%	Very feasible
3	Usage	29	4,83	96,67%	Very feasible
Eligibility		88	4,89	97,78%	Very feasible

The results of the validation of the material expert for the 3rd grade PJOK learning batting tool at SD Negeri Dalangan 1 Minggu have an average score of 4.89 with an achievement level of 97.78% (Very Feasible). This assessment includes 3 aspects, namely the physical aspect with an average score of 5 achieving 100% (Very Feasible), the design aspect with an average score of 4.83 achieving 96.67% (Very Feasible), and the use with an average score of 4.83 achieving 96.67% (Very Feasible). Referring to the table above, it can then be displayed through a bar chart:

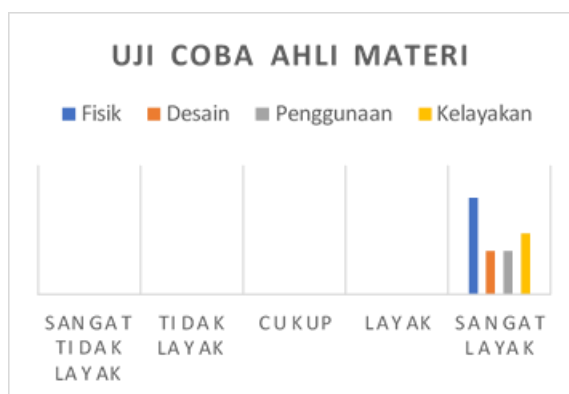


Figure 2 Diagram of Material Expert Validation Results

2. Media Expert Validation

Validation of this material expert was carried out in the lecturer's room Mr. Aris Fajar Pambudi, M.Or. on December 22, 2023. The data obtained through this media expert validation can be presented with:

Table 2 Media Expert Validation Results

No	Aspects Assessed	Sum of scores	Mean	Achievement Level	Category
1	Physical	30	5	100%	Very feasible
2	Design	28	4,67	93,33%	Very feasible
3	Usage	29	4,83	96,67%	Very feasible
Eligibility		88	4,83	96,67%	Very feasible

The results of the media expert validation for the PJOK learning batting tool that the researchers developed obtained an average score of 4.83 with an achievement level of 96.67% (Very Feasible). This assessment includes 3 aspects, including the physical aspect with an average score of 5 achieving 100% (Very Feasible), design with an average score of 4.67 achieving 93.33% (Very Feasible), and use with an average score of 4.83 achieving 96.67% (Very Feasible). Referring to the table above, it can then be displayed through a bar chart:

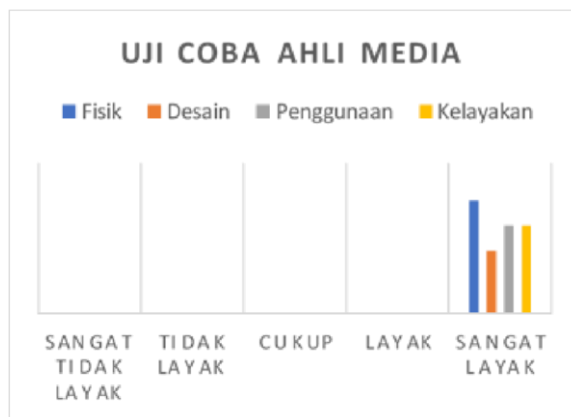


Figure 3 Diagram of Media Expert Validation Results

C. Product Feasibility Trial Results

The trial was carried out to find out the responses of students and PJOK teachers to the products that had been developed.

1. Small Scale Trial

This small-scale trial phase was conducted on December 23-25, 2023 to 6 grade 3 students at SD Negeri Dalangan 1 Minggir. 6 3rd grade students at SD Negeri Dalangan 1 Minggir. Based on the results of the small-scale trial of students on the product of the game beater in learning PJOK at SD Negeri 1 Dalangan, it is presented as follows:

Table 3 Small Scale Trial Results

No	Aspects Assessed	Sum of scores	Mean	Achievement Level	Category
1	Physical	145	4,86	80,56%	Very feasible
2	Design	163	4,53	90,56%	Very feasible
3	Usage	163	4,53	90,56%	Very feasible
Eligibility		471	4,62	87,23%	Very feasible

Based on the table above, the results of the small-scale trial of students on the product of the batting tool for the dynasty game in PJOK learning if displayed in the form of a bar diagram of the results, as follows:

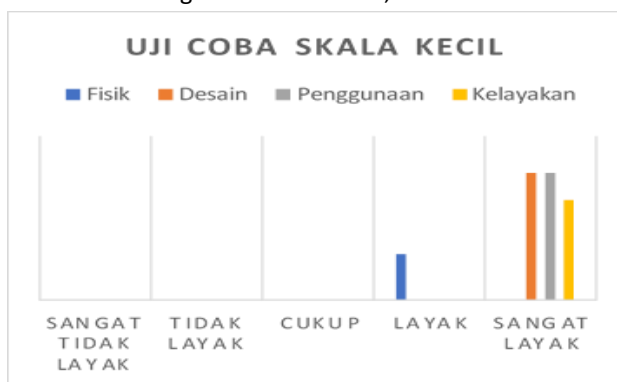


Figure 4 Diagram of Small Scale Trial Results

Thus, the students' assessment of the product of the batting tool for the game of baseball in learning PJOK is in the "very feasible" category with a percentage of 87.23% with an average score of 4.62, then the students' suggestions and input are revised according to the input from the results of the expert assessment. Based on the results of the assessment of students at the small-scale trial stage

Based on the results of the assessment of students at the small-scale trial stage, the batting tool for the dynasty game developed is very feasible to be tested at the large-scale stage.

2. Large Scale Trial

This large-scale trial phase was carried out on December 26-28, 2023 to 12 grade 3 students at SD Negeri Negeri 3.

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12 3rd grade students at SD Negeri Dalangan 1 Minggu. Based on the results of the large-scale trial of students on the product of the game batting tool in learning PJOK at SD Negeri 1 Dalangan, it is presented as follows:

Table 4 Large Scale Trial Results

No	Aspects Assessed	Sum of scores	Mean	Achievement Level	Category
1	Physical	358	4,97	99,44%	Very feasible
2	Design	355	4,93	98,61%	Very feasible
3	Usage	357	4,96	99,26%	Very feasible
	Eligibility	471	4,95	99,10%	Very feasible

Based on the table above, the results of the large-scale trial of students on the product of the baseball bat in learning PJOK if displayed in the form of a bar diagram of the results, as follows:

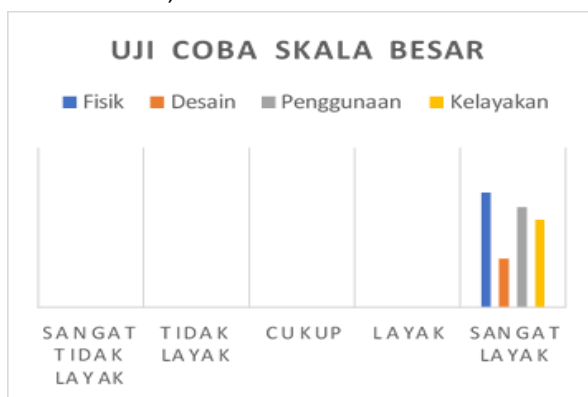


Figure 5 Diagram of Large Scale Trial Results

The students' assessment of the product of the batting tool for the game of baseball in learning PJOK is in the "very feasible" category with a percentage of 99.10% with an average score of 4.95, then the students' suggestions and input are revised according to the input from the results of the expert assessment. Based on the results of the students' assessment at the small-scale and large-scale trial stages, the batting tool for this game is developed is very feasible to be tested for effectiveness.

D. Revision of Development Products

The revision carried out on the product of the batting tool for the dynasty game in PJOK learning is based on the suggestions as well as input provided by the expert. The data used in the implementation of product revisions are input as well as suggestions that researchers get when validating products, in the form of:

1. Material Expert advice is that paint and rubber materials can use good quality materials. Then, the beater can be given 2 holes in the cross section with a diameter of 2 cm.
2. The Media Expert's suggestion is to ensure that the paint material really uses quality materials and replace rubber materials that are not slippery, more comfortable, and safe.

E. Final Product Review

The batting tool for the dynasty game in this study is made from a bat, namely light wood (teak wood). The bat is painted using natural colors and the handle is coated with rubber. The bat is made with an overall length of 40 cm with a flat cross section at the top for ball contact, which is 30 cm long, 6.5 cm wide, 3 cm thick, while the bottom for the handle is 10 cm long, 2.5 cm wide, and 3 cm thick. The weight of the batting tool is 0.315 g. The cross section of the batting tool adds 2 holes with a diameter of 2 cm. The final product of the development of a batting tool is shown through a picture, as follows: Figure 6 Final Product Review.

F. Effectiveness Test Results

This effectiveness test was carried out at SD Negeri Dalangan 1 Minggu with a sample of 18 students, using the effectiveness test. 18 students, using the t test through a sig level of 5%. But previously there will be prerequisite testing in the form of normality and homogeneity tests, with the results:

1. Normality Test

This test was carried out using the Kolmogorov-Smirnov (K-S) method through the SPSS 22 application at a sig level of 0.05 or 5%. The results obtained through the use of the K-S method, showed that the p-value of the pre-test (0.059) and post-test (0.059) exceeded 0.05, which indicated that the data was normally distributed.

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2. Homogeneity Test

This test is intended to test how similarities exist in the variants between the pre-test and post-test. The method used in this test is the Levene Test, the result obtained is sig with a value of 0.747 (≥ 0.05). This situation reflects the existence of a homogeneous variant of the data group. Thus explaining the population has homogeneous or similar variants.

3. The t-test

This test is held to determine whether or not there is an increase in the hitting skills of the baseball game from students in elementary schools after the use of the baseball game batting tool that has been developed. The significance level that researchers apply is 5%. The criteria for the results obtained are significant if t count is obtained with a value $>$ t table and sig below 0.05.

The results of the test obtained t count with a value of 18.894 which exceeds t table (df 17) 1.739 accompanied by sig with a value of 0.000 (<0.05) thus explaining the difference between the pre-test and post-test significantly. The mean of the pretest was 41.67. After the students were given a batting tool for the dynasty game that had been developed, the post-test average was 85.42. Referring to the results of this analysis, it can be understood that the basic batting skills of elementary school students increased after using the developed batting tool.

DISCUSSION

Based on research data during the implementation of small, large-scale trials, as well as effectiveness tests, it shows that, overall, students feel that the product development of the batting tool for the dynasty game made is very feasible and effective for use in learning PJOK at the elementary level. This statement is also based on the results of observations during the implementation of trials where the product development of a batting tool for baseball can arouse the motivation and learning participation of students when participating in the implementation of PJOK learning material for baseball games, such as students during the implementation of trials who feel happy and enthusiastic about using the batting tool that has been developed because they feel that the previous standard batting tool is too heavy and narrow in cross section so that students have difficulty hitting the ball when hitting while, using a batting tool that has been developed to suit the needs of students can make it easier for them to hit the ball when practicing basic batting techniques.

The results of these observations are in line with the results of his research Widodo (2014, p. 11), which explains the crosssection of the bat from a lighter and wider board when learning will make it easier for students to practice the motion of hitting the ball, so that students can more easily carry out the stroke. In addition, students who were previously passive and reluctant to try to practice basic hitting techniques because they felt they could not always hit the ball, by using the product development of batting tools, students became more enthusiastic and confident even, wanting to try continuously.

According to the opinions of students when conducting small-scale and large-scale trials, the advantages of the product development of baseball batting tools such as being more comfortable and painless when grasped because the batting tool is coated using elastic rubber and is not slippery, the batting tool development product is made of light wood to be used unlike the previous standard batting tool, the batting tool product has a larger width so that it makes it easier for students to hit the ball when practicing basic batting techniques in baseball, and according to students, the batting tool development product is unique because it has 2 holes with a diameter of 2 cm which also makes it easier for students to be able to better estimate the imposition of the ball. The holes in the cross section and the change of rubber to a more elastic and non-slip one are the result of improvements on the suggestions and revisions from material experts and media experts.

The interest of elementary school students in the product development of baseball batting tools can optimize the movement activities of students, which is in accordance with the nature of physical education in schools. According to Iswanto, & Widayati, (2021, p. 15) physical education is a learning process through physical activities designed to improve physical fitness, develop motor skills, knowledge, healthy living behavior, active, sportive attitudes, and emotional intelligence. This statement explains that through optimal movement activities from the application of the product development of the baseball bat, it is hoped that it can develop students both from the cognitive, affective, and psychomotor domains.

The development product of this batting tool is aimed at elementary school students so that, through this development product, students can play more actively and independently because the development product that is made is easy to use because basically the development product made gets "Very Feasible" results because it has been adapted to the needs and characteristics of students in elementary school. This is in line with the statement according to Mulyatiningsih, E. (2016, p. 2) that, in developing products, it is necessary to analyze the needs and characteristics of users such as if the level of understanding of students is still low, then the products developed must be made simpler so that they are easy to understand. It cannot be denied that behind the advantages of this development product, of course, there are also weaknesses such as the basic material of the bat using wood which over time will experience weathering. Based on these weaknesses, it is important for a PJOK teacher to always be able to innovate in creating learning tools or media that are feasible and attract students in participating in the learning process, in line

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with the statement according to Rahmadayani, et al, (2021, p. 151) teachers must be able to create and develop media or learning facilities with students, not just utilizing the media that is already available. In addition, it is hoped that the existing weaknesses can be a concern in conducting further development efforts to obtain product results that are more attractive and feasible for students.

IV. CONCLUSIONS

The results of the research evaluation of the school health effort program in Kapanewon Jetis Bantul Regency are:

Based on the results obtained, it can be understood (1) the product development of a batting tool for a baseball game through nine stages of development, (2) the feasibility of developing tools is assessed based on a) the material expert validity trial obtained an average score of 4.89 with an achievement level of 97.78% in the "Very Feasible" category b) the media expert validity trial obtained an average score of 4.83 with an achievement level of 96, 67% category "Very Feasible" c) small-scale feasibility trials of students obtained an average score of 4.62 percentage value of 87.23% category "Very Feasible" d) largescale feasibility trials through questionnaires showed an average score of 4.95 percentage value of 99.10% category "Very Feasible", (3) In accordance with the T test, the mean post-test is 85.42 > mean pre-test is 41.67. The increase can be declared significant because sig (2-tailed) is 0.000 (<0.05). This means that the product development of a baseball bat is very feasible and effective to use for learning PJOK in elementary school students.

SUGGESTIONS

Based on the results of this study, there are several suggestions that can be given, namely:

1. For further researchers, it is suggested that they can develop subjects and development products on other materials, so that it is hoped that the implementation of learning can be widely identified.
2. For PE teachers, it is hoped that they can optimize the use of batting tool development products that have been made and can develop other more interesting learning tools to be used in the learning process at school.

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