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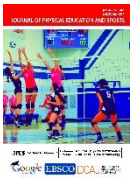

The Development of Swingtie Ball Media for Baseball Game Learning Aids for Elementary School Students

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Abstract

This study aimed to establish an aids in process of learning hit technique. This research was the development research with research and development methods. Subjects in this research were material, learning, media experts and students of 30 people for small scale trial and 110 people for big scale trial. Instrument used to collect data were interview. Observation, questionnaire and documentation. Small scale trial of material expert gave assessment score in average of 4.47 or 89% in "very good category". Big scale trial gave average score of 4.60 or 92% in "very good" category. Small scale trial of learning expert gave average score of 4.20 or 84% in "very good" category. Big scale trial gave average score of 4.53% or 91% in "very good" category. Small scale trial of media expert gave average score of 4.07 or 81% in "very good" category. Big scale trial gave average score of 4.27 or 85% in "very good" category. Product trial in small scale obtained average score of 0.89 or 89% in "very good" category. Product trial in big scale obtained average score of 0.88 or 88% in "very good" category. The conclusion in this research is that, the product named swingtie ball is effective and worthy to use for learning hit technique in baseball game for elementary school students.

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INTRODUCTION

Sport is a systematic activity to support, build and develop physical, spiritual and social potentials (Law of Republic Indonesia Number 3 of 2005 Article 1 Section 4). The scope of sport includes (1) education sport, (2) recreational sports, and (3) achievement sport (Law of Republic Indonesia Number 3 of 2005 Section 17). Sport is a systematic activity to support, build and develop physical, spiritual and social potentials. Sport currently is not only to unite the nation but it is utilized as education. Recreational, health and achievement (Apriansyah, Sulaiman, and Mukarromah, 2017).

Law of Republic Indonesia Number 3 of 2005 Article 1 Section 11, it is revealed that educational sports are physical education and sports which are conducted as part of a regular and continuous education process to obtain knowledge, personality, skills, health, and physical fitness. Sports education is held as part of the educational process conducted at every level of education starting at an early age, elementary, elementary and high school.

Physical education is a learning process through physical activity designed to improve physical fitness, developing motor skills, knowledge and behavior of healthy and active life, sportsmanship, and emotional intelligence (Ardhika, 2012). Physical education aims to develop the ability to conduct activities involving physical strength, improve the ability to think, basic movement skills effectively, efficiently, smoothly, beautifully, perfectly and it can develop a sporty, honest, disciplined, responsible, cooperative, confident and democratic through physical education learning. The learning process of physical education from the side of the sports teacher is expected to be able to teach with a variety of skills possessed from starting basic motion teaching, basic techniques, game strategies, teaching students to have discipline, tolerance, honesty, cooperation, sportsmanship and others The teacher teaches students the habit of healthy living (Febriani, Hartono, and Putra, 2016).

In learning process, one of ways to make students attracted and enthusiast in participating in physical education learning is by variation or modification. With the variation or modification of learning, it is expected to enhance students' interest and motivation in learning so it achieves optimal learning outcomes (Irawan, and Achmad, 2019).

To improve education quality, it needs teachers who can teach using some method, strategy and learning technique as well as mater and use technology (Hayati, Ahmad, and Harianto, 2017). Science and technology also encourage various efforts to renew the utilization of technological results in the learning process (Marhadini, Akhlis, and Sumpono, 2017). In this modern era, it is undeniable that science and technology have played many roles and helped in improving the quality of human life, especially in school learning. The progress of Technology Science or Science and Technology have helped many human activities in various activities, especially for the field of sports education which has helped in the learning process conducted by the teachers. Science and technology can be a tool for teachers to deliver their teaching material to students. With the use of technology in the learning process, the teacher can deliver the subject matter very easily and effectively. Teachers who teach using technology will usually be easier to achieve learning goals .The application of technology or science and technology in teaching and learning will make students more interested in attending lessons. If students are interested in what the teacher teaches, there is no need to ask students to be serious in learning because students will be active automatically and they will not feel bored because of learning. Increasing the professional competence of a teacher is strongly supported by the development of science and technology (Wicahyani, Handayani, and Hartono, 2018).

Curriculum 2013, one of basic competence of skill which want to be achieved in learning PJOK for V grade is practicing basic move combination of locomotor, non-locomotor, and manipulative according to the concepts of body, space, effort, and connection in a variety of

simple and traditional small ball games. Fast game is a game that belongs to the small ball game. Great game is conducted in teams, which are played by two teams, each team consists of 12 players. The basic techniques of playing the game include: Running, throwing and hitting the ball (Pertiwi, Sutisyana, and Sihombing, 2017). One of the basic basic game techniques that must be mastered first is the basic hit technique. The technique of hitting the ball is one of the basic techniques of playing ball which is first introduced to beginners because this skill is very important for every player involved in the match. Children at elementary school are the right time to improve the ability of perfection of movement that has been obtained in childhood, and refine the skills of various kinds of sports activities. (Sugiyanto, 2008).

Furthermore, introduction to hit basic technique in baseball game will be proper taught for elementary school students especially those in V grade. They are expected to be able to improve ability to perfection of motion. This is also supported in Curriculum 2013 in elementary school syllabus in V grade in the main game material in the first exploration activity such as the specific motion of hitting objects or balls thrown or thrown from various directions, distances, and speeds.

Based on observation and interview conducted by researcher in standard national school of Public Elementary School Semarang city as follow: (1) SDN 02 Srondol Wetan, (2) SD Karangmalang, (3) SDN Polaman, (4) SDN Bubakan from the condition of the facilities and infrastructure of the game learning is still in good condition but in the learning process the game is still stuck on the practice just a form of round game without an approach to basic techniques.

Other problems found are; when learning to play baseball, students face difficulty to do hit move, anytime the trial hits, most students don't hit the ball or target so students are reluctant to do it. It is because when learning takes place, there is no single tool used to make it easier for students to do the hitting technique. Students feel that beatings are too small that it makes difficult for students to hit the ball correctly. In addition, students also have difficulty in punching blows from opponents who change the position of the throw, it is difficult for students to learn the technique of hitting the ball. This makes monotonous and makes students saturated or unattractive which can lead to ineffectiveness of the learning process carried out and the active learning movements of students who tend to be quiet or do a little movement while playing.

All this time, the aid used is only relying on friends to hit the ball by throwing and hitting face to face. In addition, another tool called battingtee is a hitting tool that utilizes a wooden block that is plugged in the ground and the ball is placed on top of the beam, which is then hit by the student's ball. This tool is less effective because when students hit the ball, the bat will be vulnerable to the tools used. Thus, the tool is still less effective to use as an alternative to basic learning of baseball.

Physical education learning without using aid makes students face difficulty to improve movement ability. Thus, an aid is needed in the process of learning physical education to help students overcome the problem of the task of learning that is learned. To facilitate the task of the teacher and motivate students who have not mastered the hitting technique in the learning process, a learning aid is needed so that the learning objectives can be achieved. Aids in learning are useful to generate interest in students, achieve better goals, help overcome language barriers, help students to learn better and faster, stimulate students to learn, facilitate delivery of subject matter by teachers to students, facilitate acceptance of information by students. The tools used have to be adjusted to the characteristics of students (Adi, Soenyoto, and Sulaiman, 2018).

Based on the problem above, the researcher has idea to make an aid in hitting technique learning named swingtie ball for the aids of hitting learning process.

METHODS

This study uses the Research and Development method or development research.

This study uses a procedural development model, since this model is descriptive, namely a procedure that describes the steps that must be followed in producing a product.

Needs analysis is the first step in this development research. This step aims to determine whether a modification of a technical learning aid strike tool is needed or not. To answer this question, the researcher conducted a survey or observation of *Kasti* learning in a number of elementary school in Semarang City by giving a number of questions related to the *Kasti* learning process and the interest of teachers and students in the improvement of swingtie ball learning tools that facilitate the learning process.

Based on the results of the needs analysis above, the next step in this study is drafting the initial product of swingtie ball learning tools. In making this product will be made by a team that will have their respective assignments including drawing designs, making iron tool frames, drawing up design tools related to the mechanics.

The initial product draft needs to be validated in advance by experts who are in accordance with the field before being tested on a small scale trial. The researcher appointed three experts who were considered competent in their respective fields to validate the products produced. The three experts consisted of one material expert, which is Gustiana Mega Anggita, S.Pd.Jas., M.Or. a sports lecturer, one learning expert, namely Mad Buhari, S.Pd., M.Pd. a physical education teacher and a media expert, namely Arif Yosnandito, S.T. a mechanical technician.

After obtaining improvement from the experts, then the initial revisions are carried out. The initial product revision was obtained from the advice of media experts and material experts to correct the weaknesses that still exist in this study in result that later revised products can be used for field trials.

Field trials consist of small scale trials, and large-scale trials. A small scale trial was conducted to find the shortcomings of this product. Small-scale trials were conducted on students of class V A in Elementary School Srondol Wetan 02 with total of number 30 people. A large-scale trial was conducted to determine the feasibility and effectiveness of the product after it was improved and revised in a small-scale trial that had been carried out. Large scale trials in this study were conducted in 4 elementary schools in Semarang City, namely 30 Public Elementary School Srondol Wetan with total 30 students, 30 students from Public Elementary School Bubakan, Public Elementary School Karangmalang with 30 students and Public Elementary School Polaman with 20 students. So the total sample used for large-scale trials is 110 people.

After conducting a large-scale trial, the product was then repaired and revised. The obtained results from this large-scale trials are used to improve and revise the swingtie ball learning aids product, in result that they can find out the weaknesses and strengths of the products which developed after being used in the learning process at school.

The end result of this development product is a technical learning aid strike tool with the name Swingtie Ball. This tool is made attractive, safe, and practical in result that it can support the success and achievement of learning goals by students in elementary schools in the city of Semarang.

The data used in this study are qualitative data and quantitative data. Qualitative data is obtained from interviews, and questionnaires in the form of criticism and suggestions from experts in oral or written as input for product revision material. While quantitative data is obtained from observations to athletes.

The data analysis technique used to test the feasibility of the product is a questionnaire that uses choices with a 1-5 Likert scale, with very less (SK), less (K), sufficient (C), good (B) and excellent (SB) categories. The final results of the analysis of this questionnaire test are stated by:

$$P(\%) = \frac{f}{N} \times 100\%$$

P = Results to be searched in percentage
f = Number of scores that the percentage will be search
N = Criteria score which obtained from maximum scores of the questionnaire

The eligibility criteria for the questionnaire can be seen in table 1.

Table 1. Score Interpretation

Persentase	Kategori
0% - 20%	Category
21% - 40%	Very less
41% - 60%	Less
61% - 80%	Enough
81% - 100%	Well

(Source: Marhadini, Akhlis, and Sumpono, 2017)

RESULTS AND DISCUSSION

The development of swingtie ball is designed and produced into a product in the form of a hitting technique learning in *Kasti*. The main purpose of the tool is to simplify the process of learning especially related to hitting techniques. The Swingtie Ball has three functions of use which is the tool to hit the ball in an idle state, the tool hits the ball in a moving state and throws the ball.

Figure 1. Swingtie Ball

Swingtie ball constituent components are iron pipes, iron plates, electric motors, switches, plugs, electrical cables, PVC pipes, handling bolts, trolley wheels, iron spring and aluminium rubber wheels. Component tools per section used have their own functions and uses, namely as follows:

a. T-swing

This tool is made from PVC pipe or 2 inch paralon pipe and 3 inch knee pipe which is assembled to form a ball path like letter "C". The trajectory of the pipe is perforated in result that the flow of the ball is visible when the ball rolls down. The way to use this tool is: the ball is inserted into the upper pipe hole and the paddle is ready to hit the rolling ball falling from the bottom pipe.

Figure 2. T-swing

b. I-swing

This tool is made from 0.25 inch iron pipe, 2 pieces spiral iron spring and 1 mm iron which assembled to form a support pole and the ball clamp is then attached to the main pole using bolt handling. The handling bolts makes it easy to adjust the ball stand and clamp when it will be removed or installed. The ball clamp can be set up or down so that it can determine the direction of the ball being hit. How to use this tool is: the ball is placed on the ball clamp then the bat measures the distance with the tool, hits the ball right in the middle of the ball.

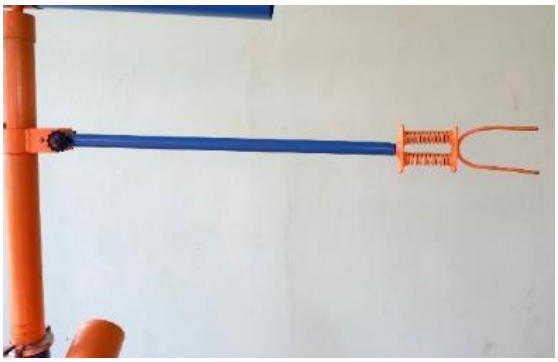


Figure 3. T-swing

Figure 4. Handling Bolts

c. E-swing

This tool is made of iron pipes, iron plates, dynamos or electric motors, handling bolts and alumunium rubber wheels. Iron pipes are used as trajectories of the ball, iron plates are used to cover electric motors which there are two types, namely iron plate stain and hollow stainless steel plate as the disposal of wind from the motor rotation. Electric motors are used to throw balls from the rotation of aluminium rubber wheels that are attached to the motorbike. In addition, the handling bolt that is connected to the motor is used to adjust the direction of the high and low ball throws, so that the ball can be thrown as desired by the bat. The way to use this tool is to turn on the motor via a switch, then the bat is at a distance of 7 meters from the tool, the ball inserted into the iron pipe into the motor so that it can throw a ball at the bat.

Figure 5. E-swing Front Look

Figure 6. E-swing Back Look

Figure 7. E-swing Side Look

Figure 8. E-swing Launcher Wheel

Figure 9. E-swing Launcher Distance Setting

d. Switch

The switch is used to disconnect the electricity network, or to connect it. In result that the electric motor can be used as throwing machine on a swing ball instrument.

Figure 10. Switch

e. Tools primary frame and trolley wheels

This tool is made from 5cm x 2cm iron pipe and trolley wheels. The primary frame of the tool is used as a tool support. Trolley wheels are used to move the tool in all directions other than that trolley wheels are also equipped with brakes to keep it stable when the tool is used.

Figure 11. Tools Primary Frame

Figure 12. Trolley Wheels

Figure 13. Trolley Wheels with Brake

Swingtie ball tool development process are through research and development procedures, namely planning, production and evaluation.

The results of the material expert validation on the trial of swingtie ball products with code A1 gave a score of assessment in phase 1 of the pre-trial with an average of 4.07 or 81% which in the category of "very good", stage 2 small-scale trials with average 4.47 or 89% which in the "very good" category and stage 3 large-scale trials with an average of 4.60 or 92% whichd in the "very good" category.

The graph of the material expert validation in stage 1, stage 2 and stage 3 is as follows:

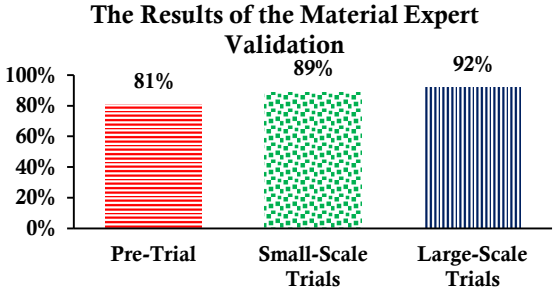
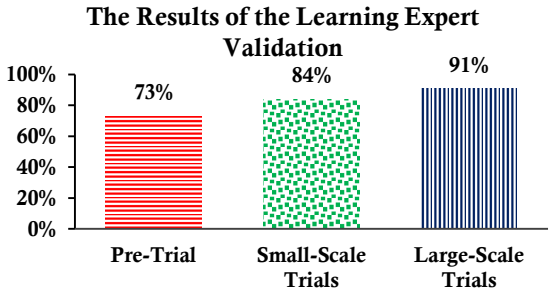


Figure 1. Material Expert Validation

The learning expert validation in the trial of Swingtie Ball products with code B1 gave an assessment score in stage 1 of the pre-trial with an average of 3.67 or 73% which in the "good" category, stage 2 small scale trials with an average of 4 20 or 84% which in the "very good" category and stage 3 large scale trials with an average of 4.53 or 91% which in the "very good" category.

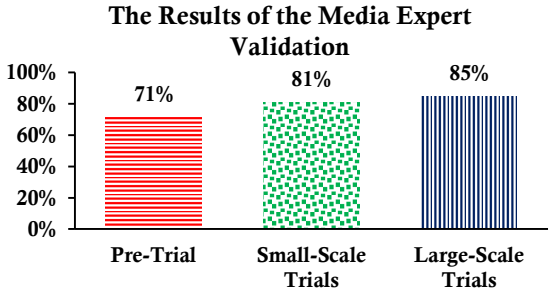
The graphs of the results of the validation of learning experts in stage 1, stage 2 and stage 3 are as follows:



Graph 2. Learning Expert Validation

The results of the media expert validation on the trial of swingtie ball products with code C1 gave a score of assessment in phase 1 of the pre-trial with an average of 3.53 or 81% which in the category of "good", stage 2 small-scale trials with average 4.07 or 81% which in the "very good" category and stage 3 large-scale trials with an average of 4.27 or 85% whichd in the "very good" category.

The graph of the media expert validation in stage 1, stage 2 and stage 3 is as follows:



Graph 3. Media Expert Validation

Products that have been validated by material experts, learning experts and media experts are then tested to students to find out the effectiveness of the product.

Small-scale product trials were carried out for grade V students of Elementary School Srondol Wetan 02 with 30 people. The results of product trials on a small scale with an average score of 0.89 or 89% which in the category of "very good" meanings can be used.

Large-scale product testing was carried out for grade V Elementary School students who were tested on 110 students from four elementary schools namely 30 students from Public Elementary Schools Srondol Wetan, 30 students form Public Elementary Schools Bubakan, 30 students from Public Elementary Schools Karangmalang and Public Elementary School Polaman with 20 students. The results of product trials on a large scale with an average score of 0.88 or 88% are whichin the "very good" category so that they can be used.

The product of this research is not much different from the product that has been produced by previous research. There are content equations in several specifications. The following is a table of differences in product specifications with similar products that have been made by previous researchers.

Swingtie ball products are tools that are made with the aim of technical learning aid strike tool in Kasti. The advantages of this product are as follows: (1) easy to operate, (2) the product manufacturing materials are easily available, (3) the tool can be assembled, (4) facilitate the teacher in the process of learning to beat the technique, (5) can be used to learn to hit the ball gradually, (6) can be used to learn to catch a ball, (7) safe to use, (8) easy to move.

Table 2. The Difference in Specifications of Swingtie Ball Products with Other Products

Swingtie ball	Battingtee	Pitching machines
Ball position on *paralon* pipe moves from top to bottom (T-swing)	Ball position on the pole with vertical position	There is no ball space in a static state
Ball position on a pole with a horizontal position (I-swing)	There is no ball space in a dynamic state	There is no space in a dynamic state
Can throw the ball in any directions (E-swing)	There is no ball thrower	Can throw the ball in any direction
Using PLN electricity sources	There is no electricity	Using accumulator
Using trolley wheels for mobility	Not using wheels	Not using wheels

Besides having advantages, it also has disadvantages. The following are some product shortcomings: (1) this product is composed of components in the form of iron so that it is quite heavy, (2) using PLN electricity in result that if the electricity goes down then this product (E-swing) cannot be operated.

CONCLUSION

Based on the results of research and discussion about the development of swingtie ball products, the following conclusions are obtained: (1) a product of technical learning aid strike tool with the name Swingtie ball has been produced. (2) swingtie ball is proper of being used as a technical learning aid strike tool for grade V of elementary school students, (3) swingtie ball is effectively used as a technical learning aid strike tool for elementary school students.

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