Kinestetik : Jurnal Ilmiah Pendidikan Jasmani 7 (4) (2023)
Kinestetik : Jurnal Ilmiah Pendidikan Jasmani
https://ejournal.unib.ac.id/index.php/kinestetik/index
DOI : 10.33369/jk.v7i4.30535

Media Development Based on Equipment Modifications in Table Tennis Games for Elementary Students

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Article Info

Article History :

Received : October 2023
Revised : December 2023
Accepted : December 2023

Keywords:

Mini Table Tennis,
Modifications,
Teaching Media,

Abstract

The purpose of this study was to introduce the game of small ball to elementary school students specifically in table tennis with a modification of the tool in the form of a table size that fits the body of elementary school children. This research method is development (Research and Development). The population of the research is sixth grade students at State Elementary Schools in Patumbak District, Deli Serdang Regency. The validation results of the expert questionnaire assessment were declared valid and usable with the percentage of media experts obtained at 83% in the valid category. Meanwhile, the percentage value from the meter expert was obtained at 80% in the valid category. Results of the questionnaire instrument assessment given to students during initial testingIt is known that the score obtained was 82% which was in the 80%-100% interval in the valid category. Results of the questionnaire instrument assessment given to students at the time large scale trialsIt is known that the score obtained was 83% which is in the 80%-100% valid category interval.So it can be said that teaching media products based on tool modification in table tennis games meet the criteria or are suitable for use by elementary school students as learning media. Conclusion, 1.The ideal size for mini table tennis has been created for class VI students at State Elementary Schools in Patumbak District. 2. Mini table tennis can be used by teachers and students in the physical education learning process in elementary schools.

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ISSN 2685-6514 (Online)
ISSN 2477-331X (Print)

INTRODUCTION

Physical education at the basic education level is adjusted to educational goals and must pay attention to the development and growth of children according to their age. The purpose of physical education in elementary schools is to help students improve physical fitness and health through the introduction and cultivation of positive attitudes, as well as basic movement skills and various physical activities.

Education for elementary school students is essentially education that is carried out with the aim of facilitating the child's overall growth and development or emphasizing the development of all aspects of the child's personality. Therefore, elementary school education provides opportunities for female students to develop their personalities and potential to the maximum through sports. On this basis, elementary school education needs to hold various activities that can develop various aspects of development such as cognitive, language, physical motor, emotional and social which are the basis for children to interact and socialize with other people. In the 2013 curriculum (k-13), one of them states that the mission of education is to provide quality alternative education to produce graduates who are competent, reliable, and have high competitiveness.

School is an educational institution that has the task of delivering students to develop all their potential. Schools are also believed to be the only way for humans today to live better lives in the future. The success of education in schools is very dependent on the learning process in the classroom. Teaching and learning activities aim to bring students to the desired behavior change. Elementary school students are individuals who are different, unique, and have their own characteristics according to their age stages. Early childhood is a golden period where stimulation of all aspects of development plays an important role in motor development tasks. It should be realized that the early days of an elementary school student's life are the most important period in the life span of an elementary school student. At this time brain growth is experiencing rapid development. Elementary school education is given to children so they can develop optimally. Given the importance of this period, the role of stimulation in the form of providing a conducive environment must be prepared by educators, both parents and teachers so that children have the opportunity to develop their full potential.

Development efforts must be made through play activities so as not to make children lose their playing time. Playing is a fun activity for elementary school children, playing also helps elementary school children get to know themselves, who they live with, and the environment in which they live. Through play, children get the opportunity to be creative, explore, discover and express their feelings. Physical education has a very important role in student development. Physical education plays a role as a means of fostering and developing individuals and groups in supporting harmonious, harmonious and balanced physical, health, mental, social and emotional growth and development. Physical education is an educational process that is carried out consciously and systematically through various physical activities in order to acquire physical abilities and skills as well as physical growth, intelligence and child growth. As a sub-system of national education, physical activities at school are mandatory for all students.

In elementary school physical education subjects there is material about small ball games. A small ball game is a type of game in sports that can be done

both individually and in teams using small balls. One of the small ball games is table tennis. Table tennis is an interesting lesson for elementary school students, because table tennis can be played by anyone, both boys and girls. This table tennis game requires the player to have basic technical skills in order to play well. The basic techniques for playing table tennis consist of: serve, smash and block. Apart from basic technical abilities, physical abilities also play a role in making the game of table tennis more perfect. To achieve the goal of physical education as an educational tool in the sense of physical education as education for the whole child, table tennis is one of the mandatory subjects in elementary school. Therefore, schools must provide table tennis facilities and infrastructure. In this way, students can play table tennis well and master the basic techniques of the game which consist of serve, smash and block and these movements become a complete movement in the basic skills of playing table tennis.

In learning physical education, learning media is needed. Learning media is an integral part of the learning process in the classroom. To achieve maximum learning results, students must have knowledge about managing learning media both as teaching aids and as support so that the material or lesson content becomes clearer and can be easily mastered by students. One of the learning media is modification. Modification is an effort made to create and display something new, unique and interesting. Modification here refers to the creation, adjustment and display of new, unique and interesting tools/facilities and infrastructure for a physical education teaching and learning process. The implementation of modifications is very necessary for every physical education teacher as an alternative or solution in overcoming problems that occur in the physical education teaching and learning process. Modifications are an implementation that is highly integrated with other aspects of education.

This learning modification can be classified as: 1) Equipment, 2) Arrangement of space for practicing, and 3) number of students involved. Teachers can reduce or increase the complexity and difficulty of teaching assignments by modifying the equipment used to perform the skill, for example the lightness, height, length and shortness of the equipment used. Based on the results of my observations at 10 public elementary schools in the Patumbak District, Deli Serdang Regency, there are still limitations to table tennis, which is a national standard in every elementary school, so modifications are needed. Among the 10 public elementary schools in Patumbak sub-district, there are 6 public elementary schools that have table tennis courts that are of national standard size at school, the conditions of the learning process for table tennis game material at this school, it was found that student learning outcomes had difficulty playing table tennis due to size. tables that are too long and wide make it difficult for students to learn to play table tennis. Meanwhile, 4 state elementary schools do not have table tennis courts in elementary schools. Conditions of the learning process for table tennis game material at this school, Based on the various problems above, the researcher will introduce the small ball game specifically to the table tennis game material for elementary school students by modifying the tools for playing table tennis, such as the size of mini table tennis, which is expected to improve student learning outcomes in mastering the game of table tennis at school level.

METHODS

This type of research is research and development. According to

Sugiyono, (2019) research and development methods are research methods used to produce certain products and test the effectiveness of these products. According to Gay (2000) development research is an attempt to develop an effective product for use in schools, and not to test theory.

Research Subjects and Objects

The subjects of this study were sixth grade students of public elementary schools in Patumbak District, Deli Serdang Regency. The 2 locations of public elementary schools that were used as research sites were SD Negeri 106166 and SD Negeri 104212.

Data Collection Technique Instruments

The instruments used in this development research are as follows.

1. Observation

   Nasution (in Sugiyono, 2013) states that observation is the basis of all science, scientists can only work based on data, namely facts about the real world obtained through observation. This observation was carried out at Public Elementary Schools in Patumbak District, Deli Serdang Regency.
2. Interview

   Interviews are used as a data collection technique if the researcher wants to conduct a preliminary study to find problems that must be researched, and also if the researcher wants to know things from the respondents in depth and the number of respondents is small.
3. Questionnaire

   Sugiyono (2012) A questionnaire is a data collection technique by giving written questions to respondents to answer. The questionnaire can be in the form of closed or open questions/statements and accompanied by a suggestion column.

Data Analysis Techniques

In this research, data analysis techniques were used using descriptive analysis techniques with percentages. Quantitative data analysis from distributing questionnaires can be obtained using this method.The following is the formula for distributing questionnaires to test subjects for data processing:

1. Previous research was conducted to obtain a needs analysis.
2. The results of observations made in the study, the researchers found that student learning outcomes had difficulty playing table tennis because the size of the table was too long and wide so that students had difficulty learning to play table tennis.
3. FromThe researcher's observations found that student learning outcomes were not optimal in playing table tennis at school and there was no approach method that directed children to be able to play table tennis in elementary schools.

The analysis used is quantitative descriptive analysis with the aim of knowing students' needs for the problems faced during the physical education process Joni Tohap Maruli Nababan (2019). According to Bogdan & Bikien (Moleong, 2006) Qualitative data analysis is an effort made by working with data, organizing data, sorting it into manageable units, synthesizing it, looking for and finding patterns, discovering what is important to people and what is learned, and deciding what can be told to others. . The data analysis technique used in this research is a quantitative analysis technique which is an assessment using

numbers. Percentages are intended to determine the status of something that is presented as a percentage and is still presented in the form of a percentage.

The percentage of eligibility teaching media based on tool modification in table tennis games for learning for sixth grade elementary school studentsIn this development research, feasibility is classified into five categories using the following scale:

Table 1. Percentage Categories according to Sugiyono, (2014)

Percentage of Achievement	Interpretation
Between 86% to 100%	Very Worth It
Between 71% to 85%	Worthy
Between 56 to 70%	Decent Enough
Between 41% to 45%	Not feasible
Between 0% to 40%	Totally Not Worth It

There are several ways to analyze assessment data from research questionnaires using the following steps:

1. The questionnaires that have been filled out by respondents are checked for completeness of the answers, then arranged according to the respondent's score.
2. Give a score to each answer based on the specified weight.
3. In accordance with the previously determined weight.
4. Calculate the percentage of each sub variable using the formula used in calculating the score percentage.

Table 2. Percentage Analysis of Evaluation Results by Trial Subjects

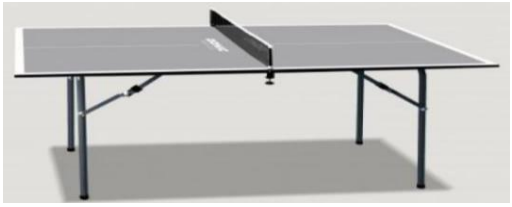
Percentage	Information	Meaning
80%-100%	Valid	Used
60%-79%	Fairly Valid	Used
50%-59%	Invalid	Replaced
<50%	Invalid	Replaced

Table 3. Guttman Scale Rating Categories

No.	Score	Information
1.	Score 2	Yes
2.	Score 1	No

RESULTS

The product expected from this development is in the form of media tools that can improve learning outcomes in mastering the game of table tennis at the elementary school level. This product is a modified tool for playing table tennis where the size of the table tennis court is reduced to 86% of its original size.Mini table tennis is a modification of the national standard table tennis size into a mini table tennis size with a length of 2.35 m, a width of 131 cm and a table tennis height of 65 cm. Mini table tennis is made of iron and plastic, the pole is manually modified (hydraulic) which means it can be raised according to the standard table tennis height and can be lowered according to the modified height. The product being developed can be made through stages in development research. Borg and Gall's Research and Development (R&D) development was used in this research.(Sugiyono, 2019: 404) with 9 stages. From the results it can be concluded that researchers designed product designs according to the potential and problems based on information from existing problems in the field. The concept in making this tool is in the form of an image that will be worked on, as follows:



Picture 1. Tool Draf

In this research stage, researchers used several types of iron and other materials to assemble the tools. The development of mini table tennis media in this research will use several main components including:

1. Plywood

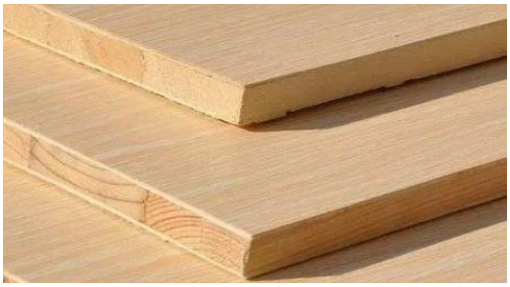


Figure 2. Plywood

Plywood is used as a table for mini table tennis. The plywood is rectangular in shape with a thickness of 20 mm. 2 pieces of plywood with a length of 2.34 m and a width of 130 m.

2. Iron elbow

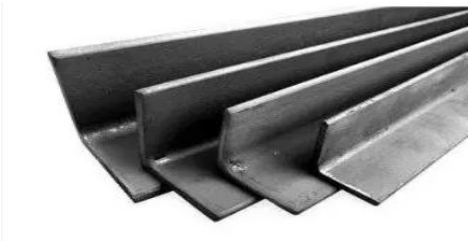


Figure 3. Angle Iron

This angle iron is used to frame plywood with a thickness of 30 KS (Emperor Steel). This angle iron consists of 6 angle iron rods, 2 rods measuring 2.35 m long and 4 rods for a width of 131 m.

3. Butterfly Hinges

Picture 4. Butterfly Hinge

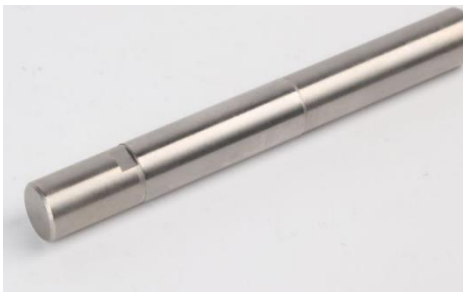
This butterfly hinge is used to connect the two plywood in mini table tennis. This butterfly hinge works to fold and unfold the mini table tennis. This butterfly hinge is as much as 2 hinges with a size of 3 inches. This butterfly hinge is made of metal material and is thin.

4. Hollow Iron

Figure 5. Hollow Iron

Hollow iron is used as a pole and manual hydraulics in mini table tennis, this hollow iron is in the shape of a square made of galvanized material to make it stronger, with a size of 40x40 mm as many as 8 sticks. 4 rods for poles with a length of 45 cm and 4 sticks for mini table tennis baseboards. Hollow iron for manual hydraulics with a size of 30 x 30 mm as much as 4 hollow iron rods with a length of 40 cm.

5. Shaft Iron



Picture6. Shaft Iron

This shaft iron is used to fold and unfold mini table tennis poles. This shaft iron has a thickness of 1.6 mm with a length of 130 cm and 2 shafts are used.

6. Iron Nako

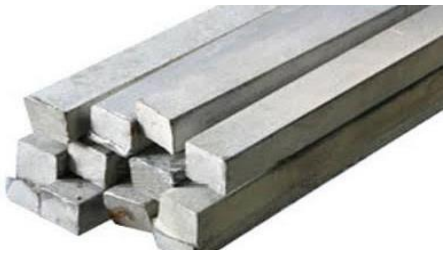


Figure 7. Iron Nako

Nako iron is used to lock the settings up and down the size of a predetermined mini table tennis. Nako iron measures 12 mm with a length of 7 cm in the form of a T of 4 ingots of Nako iron.

7. Steel bar

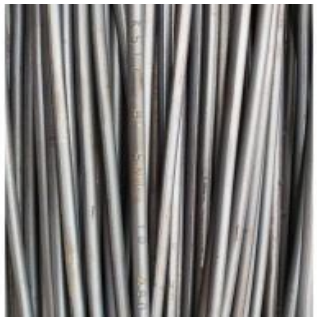


Figure 8. Rebar

This concrete iron is used to support mini table tennis and strengthen the table tennis pole when the table is opened. This concrete iron is used as many as 4 concrete iron with a length of 42 cm.

8. Steering Wheel

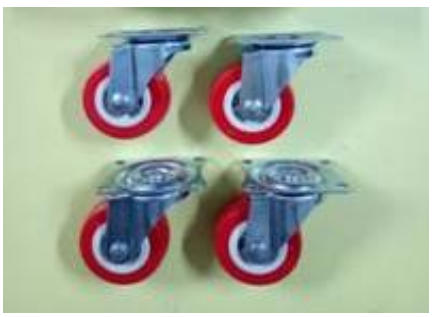


Figure 9. Steering Wheel

This steering wheel is used for the mini table tennis leg wheels. This steering wheel functions to make it easier to push and fold the mini table tennis. After selecting the product ingredients for mini table tennis, the following are the results of the production before being given to experts for validation and testing on students.

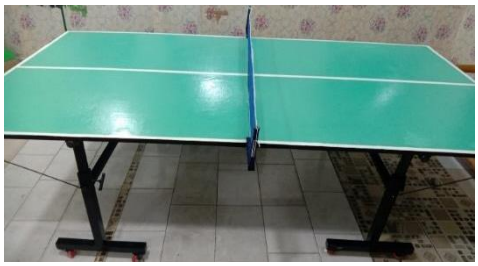


Figure 10. Mini Table Tennis

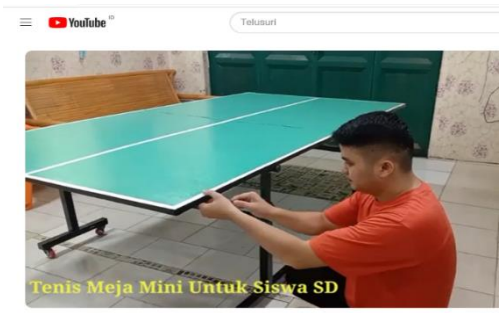


Figure 11. Product forms are made in a youtube video

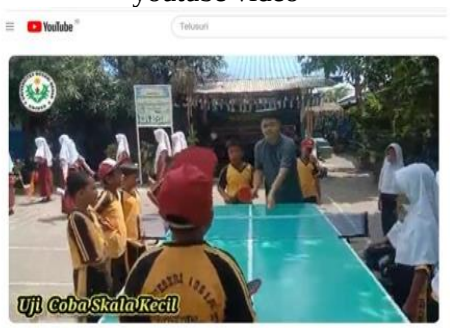


Figure 12. Small - scale trials

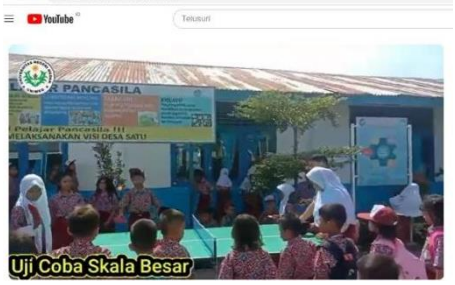


Figure 13. Large-scale trials

DISCUSSION

Based on the data findings on the background of the problem that has been explained, the researcher contributed ideas to the problems that exist in State Elementary Schools in Patumbak District, Deli Serdang Regency, where the conditions of the learning process for table tennis game material in elementary schools, it was found that student learning outcomes were not optimal in playing tennis. table at school and there is no method of approach that directs children to play table tennis in elementary school.

Therefore the researchers made a design for the development of a mini table tennis tool for elementary school students. Then it is discussed with the supervising lecturers and tool-making experts. After discussions with tool-making experts, the tool-making process took approximately 1 month, with the concept to be developed namely, modifying the height of the table and the length and width and modifying the folds of table tennis poles to fold into suitcases. As explained by Riantoso (2016) suggests that developing learning tools or media can be done by adding a lot, modifying the size, modifying the height and low, modifying the size and can modify the shape.

This research was conducted in elementary schools, in terms of previous research conducted by Mori Saputra & Subhan (2019) concluded that through modification of wall media tools it can improve learning outcomes for table tennis basic movements in class V SD Negeri 115/II Bedaro., and research previously conducted by Marzuki (2018) concluded that through modification of the Wall Media in Class VI Elementary School Students it can improve Forehand Service Learning in Table Tennis. Boma Sandy (2020) concluded that Video Tutorial-Based Table Tennis Service Learning Media for Students can be used in an effort to improve student learning outcomes.

As an explanation from Soeptono (2000) in Arya Manual Prayuda (2022) argues that incorporating media or tools into the learning process is very beneficial for teachers and students.

The selection of materials and the manufacture of the instrument in the form of a mini table tennis framework is the product of this stage, the necessary framework and requirements have been completely designed. On this occasion, researchers also discussed with experts about conducting product validation, the results of product validation are the basis for deciding whether or not the product can be used. In this validation, there are 2 (two) experts in this study, namely, media expert and material expert, quoted from (KBBI) that a media expert is someone who has extensive knowledge in media and educational media, a material expert is someone who is able to validate material and questions for evaluation presented in learning media. https://kbbi.lektur.id/

The validation results of the expert questionnaire assessment were stated to be valid and can be used with the total percentage of media experts obtained 83% in the category (valid or feasible). While the percentage value of the material experts obtained 80% with the category (valid or proper). In product validation to experts, this stated that mini table tennis teaching media was feasible to be tested. Researchers conducted trials, the results of small group trials reached 82% valid category, where the value obtained was known as the scores of small group trials in grade VI elementary school students totaling 10 students. The next stage is conducting large group trials. The results of the large group trial with 30 student samples obtained a score of 83% in the category (valid or feasible).

CONCLUSION

The conclusion must answer the problem, namely how to design the development teaching media based on tool modification in table tennis games for class VI students of public elementary schools in Patumbak District, Deli Serdang Regency, then based on the steps that have been carried out in this study, the research conclusions can be drawn as follows:

1. The ideal size for mini table tennis has been created for students of class VI of SD Negeri in Patumbak District, Deli Serdang Regency.
2. Mini table tennis can be used by teachers and students in the physical education learning process in elementary schools.

REFERENCES

Anwar, M.H. (2005). Primary School Physical Education as a Vehicle for Children's Movement Compensation. Indonesian Journal of Physical Education, 3(1), 45–53. Https://Journal.Uny.Ac.Id/Index.Php/Jpji/Article/View/6171

Bazin, B.S. (2010). Physical Education, Sports and Health 3 for Middle School/Mts Class IX. CV. Nugraha's son.

Boma S. (2020). Learning Media for Table Tennis Serving Based on Video Tutorials for Class VII Students of SMP Negeri 1 Koba. Journal of Physical and Adaptive Education, 03, 1–6. https://Doi.Org/10.21009/Jpja.V3i01.15568

David A. (2012). Get to know the Table Test. East Jakarta: PT Balai Pustaka.

Dariyo A. 2007. Psychology of Child Development in the First Three Years. Bandung: PT Refika Aditama.

Djamarah. (2008). Learning Psychology. Jakarta: Rineka Cipta.

Fathurrohman, P. & MSS (2009). Teaching and Learning Strategy Through Instilling General Concepts and Islamic Concepts. PT Refika Aditama.

Hasdarta & Saputra. (2011). Physical Education Learning for Elementary Schools. PT. Erlangga.

Hasibuan, S., Chairad, M., & Nugraha, T. (2020). Developing IT-based learning media in sports anatomy. international sports studies (ISS), 42(03), 43-49

Hasibuan, S., & Chairad, M. (2023). The Development of Augmented Reality (AR) in Anatomy course, international journal of education in mathematics, science and technology (IJEMST), 11(03), 744-754.

Hurlock, E. B. (2011). Developmental Psychology An Approach Across the Life Span, Jakarta: Erlangga

Marzuki, I. (2018). Efforts to Improve Forehand Service Learning in Table Tennis Through Wall Media for Grade VI Students at SDK Wureh, West Adonara District, East Flores Regency. Journal of Social Sciences and Education, 2(3), 6–7.

Moleong. (2006). Qualitative Research Methodology. PT Teen Rosdakarya Offset.

Mori Saputra, DI, & Subhan, M. (2019). Improving Learning Outcomes of Basic Table Tennis Movements Through Modification of Wall Media Tools in Class V SD Negeri 115/II Bedaro. Journal of Educational Estuaries, 4(2), 445–454. https://Doi.Org/10.52060/Mp.V4i2.182

Muktiani, NR (2014). Identification of Difficulties in Learning Basic Pencak Silat Movements in Subsidized PJKR Students at FIK UNY. Indonesian Journal of Physical

Education, 10(April), 23–29.

Nugraha, B. (2015). Early Childhood Sports Physical Education. Journal of Children's Education, 4(1), 557–564. https://Doi.Org/10.21831/Jpa.V4i1.12344

Pane, A.D.P, Akhmad, I., & Hasibuan, S. (2018). Development of Tutorial Learning Media in Audio-Visual. Advances In Social Sciences, Education And Humanities Research, 200(Aisteel), 769–773.

Education, D.N. (2003). 2004 Curriculum Competency Standards for Physical Education Subjects for Elementary Schools and Madrasah Ibtidaiyah. Ministry of Education.

Permatasari, D. (2017). Table Tennis Smart Book (Print I). Grace.

Rahman, A., Simatupang, N., & Sinulingga, A. (2021). Development of Traditional Games on Manipulative Movement Abilities in Elementary School Children. Journal of Sport Pedagogy, 07(2), 27–31.

Samsudin. (2008). Sports and Health Physical Education Learning. Litera Prenada Media Group.

Sarjono & Sumarjo. (2010). Physical Education, Sports and Health (For SMP/Mts Class IX). CV Various Sciences.

Slameto. (2010). Learning And The Factors That Influence It. PT. Rineka Cipta.

Soeptono. (2000). Sports Facilities and Infrastructure. Jakarta: Ministry of National Education.

Sugiyono, P.D. (2019). Quantitative Qualitative Research Methods and R&D (Dr. Ir. Su). Alphabet.

Sujarwadi, D.S &. (2010). Sports and Health Physical Education for Class VIII SMP/Mts. Center for Bookkeeping of the Ministry of National Education.

Sunarto. (2010). Sports physical Education and health. Center for Bookkeeping of the Ministry of National Education.

Suprijono, A. (2010). Cooperative Learning Theory and Applications of paikem. Student Library.

Supriyadi, M. (2018). Implementation of the Teaching and Learning Process of Sports and Health Physical Education in Elementary Schools. Journal of Physical Education and Sports, 1, 64–73. Https://Doi.Org/Https://Doi.Org/10.31539/Jpjo.V1i2.136

Sutarmin. (2010). Skilled in Exercising Table Tennis. Intermedia Age.

Suyadi. (2019). Educational Educational Games (Power Book). Alphabet.

Tomolius. (2012). Success Trains Basic Skills in Table Tennis Games and Assessment. Presented in the Context of Developing Elementary School Sports Clubs throughout Indonesia Phase II. ALPHABET.

Yanti, D.F, Simatupang, N., Sunarno, A., Studi, P., Sport, P., Medan, UN, Supriadi, A., Siregar, I., & Endriani, D. (2020). Development of Colored Shuttlecocks as Media. 06, 51–54.