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Development of a drill bounce board on a table tennis game

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ABSTRACT

Table tennis was originally a recreational sport played for fun. Table tennis is played with the aim of scoring points by hitting the ball over the net onto the opponent's table so that the opponent cannot return the ball. A backboard tool can be used to help pupils practise driving shots in table tennis. The backboard tool can also be used to increase the repetitions of students' drive shot consistency training. The aim of this research is to develop table tennis drills using a backboard at Sriwijaya State Sports School in 2023. The type of research used is quantitative with a developmental approach method. The population and sample in this research are 10 Sriwijaya State Sports School table tennis athletes. person. The results of this research indicate that the developed backboard tool is effective in increasing motivation to practice drill drive strokes in table tennis, based on the results of interviews with students after practicing drill drive strokes using a backboard tool. The conclusion of this study is that the development of a backboard tool for table tennis training at the Sriwijaya State Sports School in 2023 is effective in increasing student motivation to practice drill drive strokes. Apart from this, the findings or novelty of this research is different from previous research in that the reflective board products produced are more practical and easy to carry and store. Subsequent research suggests developing more portable or foldable versions to facilitate outdoor use or in places with limited space.

***Keywords**: development, drill bounce board, table tennis games*

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INTRODUCTION

Sport plays an important role in human life. In today's modern life, people cannot be separated from sports activities, both to improve performance and the need to maintain body condition to stay healthy (Aliriad, 2020; Aliriad et al., 2023). Sport can create a physically and mentally healthy person with a disciplined disposition and, in the end, a qualified person. In the effort to form a young generation capable of becoming the backbone of the nation's fighting successor, education through sports has long been regarded as the most efficient and effective means (Endrawan & Aliriad, 2023; Satria et al., 2023). This is because human development is essentially towards a whole Indonesian person who is physically and mentally healthy. Physical education is carried out through physical means, namely physical activities that are generally carried out at a fairly high tempo, especially large movements of dexterity and skill that do not need to be too fast, too smooth, and perfect or of high quality in order to achieve benefits for students (Aliriad et al., 2024; Endrawan et al., 2023). Although the means of education are

physical, the benefits for students include non-physical areas such as intellectual, social, aesthetic, cognitive and affective. Physical education is committed to improving the body and the mind, which affects all aspects of a person's daily life or a person as a whole. Physical education uses a holistic approach that covers all areas, whether organic, motor, cognitive or affective. One type of sport that will be discussed in this study is table tennis (Aprilia, 2021; Nafiati, 2021).

Table tennis was originally a recreational sport played for pleasure. The effect of pleasure on sporting activity can increase motivation to become an accomplished athlete (Emda, 2018; Nofianti, 2019). Currently, the game of table tennis is played in the community, at school and in college. Table tennis is played with the aim of scoring points by hitting the ball over the net onto the opponent's table so that the opponent cannot return the ball. Table tennis can be played alone or in pairs. People who are learning the basic techniques of table tennis can be called students. The characteristics of table tennis students are (1) practicing the basic techniques of table tennis punches such as drive, service, and push, (2) learning the basic rules of table tennis, (3) applying the basic skills in simple games, and (4) practicing drills accompanied by a coach to improve their skills (Fuchs et al., 2018; Sung, 2019).

On the other hand, (Siregar et al., 2023; Zhu & Xu, 2022) explains the characteristics of students who are easily influenced and there is a single difference in certain characteristics. Table tennis students need to master the basic techniques of table tennis strokes in order to develop and improve their skills in table tennis matches. Table tennis students need the opportunity, time and support to learn the basics of fine and gross motor skills necessary to maintain a healthy and active lifestyle. Physical activity should be an important part of a child's daily life. Sriwijaya State Sports School is a place for training and coaching young athletes in South Sumatra, table tennis is one of the sports taught at the school. The results of the researchers' observations at the Sriwijaya State Sports School, saw some students who have not yet mastered the skills of forehand and backhand driving techniques well. Reinforced the results of an interview with Mr. M. Yamin, as a table tennis coach of Sriwijaya State Sports School, it is known that the ability of forehand and backhand drive in Sriwijaya State Sports School is 48%. While the average backhand drive in Sriwijaya State Sports School is 46%. This is because the exercises are given only monotonous, without the use of AIDS, so that students are easily saturated. The game of table tennis requires a precise hit on the target to make it difficult for the opponent to return the ball, thus adding points to the game. Therefore, the table tennis students of Sriwijaya State Sports School must practise forehand and backhand driving drills.

Some table tennis strokes are drive, service and push strokes. In fact, table tennis strokes are divided into two, namely forehand and backhand (Wang et al., 2021; Zhou & Zhang, 2022). Table tennis requires varied practice to improve the consistency of forehand and backhand strokes. One of the aims of varied practice is to prevent students from becoming bored when practising table tennis stroke drive drills. Of the various variations of table tennis exercises, the researchers focused on practising alone with a bounce board tool. The bounce board tool can also be used as a means to increase athletes' motivation in practising forehand drive topspin punch drills (Dewangga Yudhistira, 2020). Prior to the product design, the researchers analysed the product needs of the table tennis students at the Sriwijaya State Sports School. The results of the product need analysis of the bounce board tool are described as follows. A total of 10 students (100%) responded that table tennis extracurricular activities took place on Tuesdays and Thursdays. A total of 10 students (100%) answered that they did not know the application of the drill method in table tennis training. A total of 5 students (50%) answered that they had never practised table tennis driving shots and as many as 5 students (50%) answered that they had practised table tennis driving shots. A total of 10 students (100%) answered that they had never practised bouncing the ball onto the bounce board.

A total of 10 students (100%) responded that they needed a bounce board tool to practice table tennis bouncing. The researcher designed a bounce board tool for use by table tennis students. Tool design can also be referred to as tool engineering, which is carried out before moving on to the stage of making the initial product (prototype). The tool design process includes determining the purpose of making tools, planning product shapes, determining tool specifications, determining tool making materials, and determining the target user of the tool. A good tool design adapts to the needs of the tool user. For this reason, a designer may conduct interviews with tool users and read books and articles on the subject in order to design tools that meet the user's needs. Good tool design that follows the laws of the human body works, or is called ergonomic. Researchers can work with experts and technicians to design and manufacture ergonomic products. Ergonomics involves identifying problems, conducting experiments to solve them, applying the results of the experiments and demonstrating effectiveness. In practice, trial and error approach is used (Thatcher et al., 2020).

The bounce board tool can help students to practise the ping-pong stroke drill. The bounce board tool can also be used to add reps to a student's drive punch consistency training. So the goal of increasing the consistency of the student's drive punch can be achieved by adding reps to the student's drills. Motor learning theory states that through constant repetition, the

brain and motor nervous system will form a stronger connection between stimulus (input) and response (output), thereby increasing the ability to perform movements consistently and accurately (Aliriad et al., 2024).

But Sumatra Sports School does not have such a tool yet, so the method of practising the drill itself with a bounce board tool is good for improving the forehand and backhand drive skills of table tennis students. The high repetition of the students in practising the consistency of the forehand and backhand strokes by hitting the ball as often as possible is expected to get the students used to hitting the ball towards the target so that the consistency of the stroke increases from before. One of the aims of the bounce board stroke drill is to improve the consistency of students' table tennis strokes. This research and development will produce a bounce board tool that meets the needs of students. So that the bounce board tool is feasible and can be used as a means for students to practice and improve the consistency of their table tennis forehand drive and backhand drive strokes.

METHODS

The research method to be used in this study is quantitative research with a developmental (research and development) approach (Hamzah, 2021; Sa'adah & Wahyu, 2020). Developmental research methods are research methods used to produce a particular product and test the effectiveness of that product. R&D research in education aims to produce new products through the process of development stages. Population is a generalisation area consisting of objects and subjects that have certain qualities and characteristics that research applies to study and then draw conclusions (Sugiyono, 2019). The population in this study is table tennis players Sriwijaya State Sports School amounted to 10 people.

The sample is part of the number and characteristics that the population has. The sample used in the study is purposive sampling. Purposive Sampling technique is sampling by using certain considerations in accordance with the desired criteria to be able to determine the number of samples to be studied. Based on the above explanation, the sampling technique that will be used is purposive sampling, which is a sampling technique based on certain considerations . The samples used in this study are the table tennis students of Sriwijaya State Sports School, a total of 10 people.

The questionnaire is used to analyse the students' ability to develop products. The validation questionnaire is shown to the validators, namely motion experts. This questionnaire is used by the researchers to determine the product evaluation through the criticism,

suggestions, feedback and answers of the motion experts. This validation questionnaire was prepared based on the accuracy and suitability of presentation material instrument, language accuracy with good and correct Indonesian language rules. Student response questionnaire was shown to students of Table Tennis Sports Sriwijaya State Sports School, this questionnaire is used to find out information about the feasibility of the products developed in this study. The process of completing the questionnaire is done by explaining the purpose of the response questionnaire, so that students can easily understand the content in providing answers. Questionnaire responses from students in this study were prepared based on the criteria of feasibility tools to develop drill exercises in table tennis using a bounce board at Sriwijaya State Sports School.

This study aims to develop a bounce board as a tool to improve the ability of drill punch forehand and backhand drive table tennis students of Sriwijaya State Sports School. This study was conducted in five stages, namely (1) preliminary research, (2) product design, (3) product development, (4) field trial, and (5) evaluation (Sugiyono, 2019). The following are the results of the field findings, the description of the research and development of bounce board tools for table tennis stroke driving drill exercises for Sriwijaya State Sports School students.

The data analysis used in this study is a descriptive qualitative analysis of the results of interviews, observations and input from experts. Data developed in the form of criticism, suggestions, input and feedback as input in revising the product under development. And quantitative data analysis. The results of the research on products carried out by experts and athletes will be processed using quantitative descriptive analysis. Assessment of the number of validation questionnaires and questionnaires containing athlete responses to questions about the products being developed. The data is presented in the form of figures obtained from the expert validation questionnaire measured using a Likert scale. A Likert scale is used to measure the opinions and perceptions of people or groups.

RESULTS AND DISCUSSION

Data collection instrument used questionnaires filled in directly by the 3 validators. The instrument is a kind of closed questionnaire with a choice of answers very good, good, bad and not good. The instrument consists of 10 evaluation indicators, namely (1) the practicality of the tool, (2) the tool is easy to carry, (3) the strength of the tool structure, (4) the tool is easy to store, (5) the quality of the tool materials, (6) the price of the tool is economical, (8) the tool can be used for exercises with irregular ball stimulation, (9) the tool can be used for exercises

with irregular ball direction stimulation, and (10) the tool is safe for use by table tennis students.

Results

The following table shows the results of how the table tennis instructors were rated:

Table 1. Table Tennis Expert Assessment Results

No	Assessment Indicators	Score V.1	Score V.2	Score V.3	CVR Results	Category Validation
1.	Practicality of the tool.	4	3	4	0,904	Height
2.	Easy to carry tool	4	3	4	0,904	Height
3.	Tool structure strength	4	3	4	0,904	Height
4.	Tools are easy to store	4	4	3	0,904	Height
5.	Tool material quality	3	4	4	0,904	Height
6.	Economical tool price	3	3	4	0,809	Height
7.	Compatibility of the tool with Table Tennis games	4	3	4	0,904	Height
8.	The tool can be used for exercises with a fixed ball stimulus	4	3	4	0,904	Height
9.	The tool can be used for exercises with non-fixed ball stimulus	4	3	4	0,904	Height
10.	Safe tools for students to use	4	3	4	0,904	Height

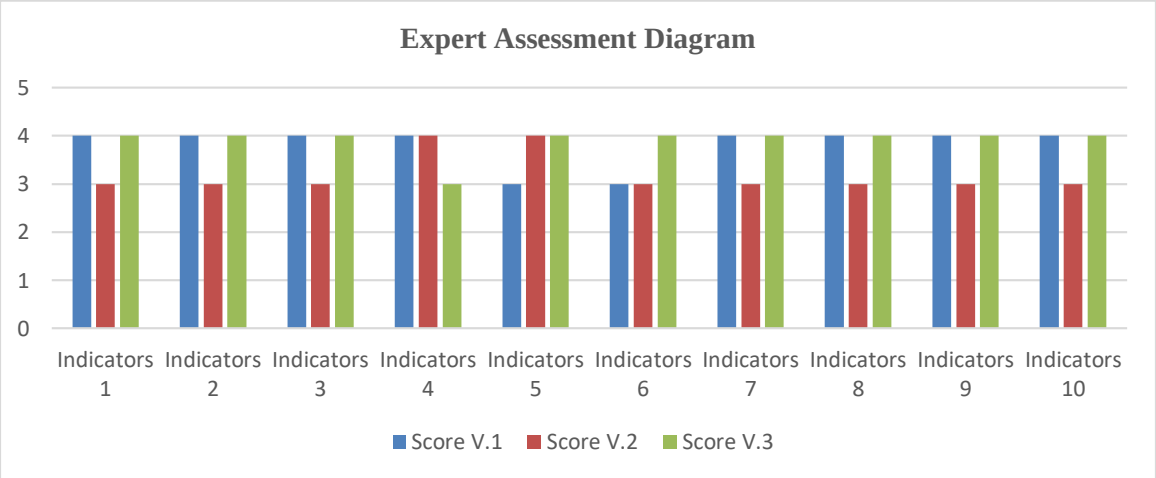

Figure 1: Expert Assessment diagram

After the field trial phase, the researchers carried out an evaluation phase. Evaluation can be interpreted as judgement. The evaluation of the field trial was done by the table tennis coach through the evaluation of the training activities, the researcher knew the parts that needed to be improved for the application of the forehand and backhand driving drills with the bounce board tool. The results of the table tennis coach's evaluation are described in the following table:

Table 3. Table Tennis Coach Evaluation Results

No	Inquiry	Score	Percentage (%)	Categories
1.	Exercise activities conducted by students run in accordance with the guidelines of the exercise	4	100%	Very good

2.	Exercise activities run systematically starting from the introduction, core activities, and closing	3	75%	Good
3.	Core exercise activities go well	4	100%	Very Good
4.	All training participants attended the table tennis training activities	3	75%	Good
5.	Bounce board tool can be used during training activities	4	100%	Very Good
6.	The table tennis equipment to be used is well prepared.	4	100%	Very Good
7.	Exercise results obtained by students in accordance with the objectives of the exercise	4	100%	Very Good
8.	There is progress in mastering students ' skills in the consistency of table tennis forehand drive strokes.	4	100%	Very Good
9.	There is progress in mastering students ' skills in the consistency of table tennis backhand drive	3	75%	Good
10.	Active table tennis students follow the table tennis punch drive drill training	3	75%	Good
11.	Students enthusiastically participate in Table Tennis punch drive drill training activities	3	75%	Good
12.	Students warm up well	3	75%	Good
13.	Students are given directions on today's practice material.	4	100%	Very Good
14.	Students are evaluated at the end of the training	4	100%	Very Good
15.	The drill practice method is already applied in Table Tennis drive punch drills for students.	4	100%	Very Good
	Total	54	90%	Sangat Baik

Discussion

The final product of the bounce board is the result of the assessment of 3 table tennis experts and field trials. The final product is a 200 cm x 50 cm reflective board with a rectangular shape. The reflective board is 4 cm thick. The bounce board is equipped with bumpers on the right and left side of the board. There are nuts and bolts in the buffer section to adjust the inclination of the board. For practical use, the tool is placed on the table. Add a chalk line to mark the area where the ball often bounces and returns to the batter. This is important so that the coach knows which part of the bounce board the students are most likely to hit. As a complement to the product, the researcher produced instructions on how to use and maintain the bounce board. This is done so that table tennis coaches and students are aware of how to use and maintain the bounce board. Bounce boards are made of MDF wood. The characteristics of MDF wood, which is light and strong, are the basis for researchers to choose reflective board materials made of MDF wood. MDF wood material is durable and long lasting when not exposed to water and direct sunlight. The reflective board is coated with 20 pieces of rubber bet. Rubber bumpers are useful for making the direction of the ball bounce harder and more accurate. It works in the same way as wood on a rubber-coated pitch. Before applying the

rubber bumper, the reflective board is first sanded, then cleaned and then Fox Glue is applied to the rubber and wood reflective boards. The bounce board is equipped with hinges for easy folding. The ease with which users can fold the bounce board means that it is easier for the tool to be moved anywhere according to the user's needs.

The development of bounce board products has succeeded in increasing the drive stroke in Table Tennis (Irmawati et al., 2020; Sari & Antoni, 2020).The main focus of the bounce board development is to improve the bounce quality of the ball, which plays a crucial role in providing a more effective training experience for players. The use of bet rubber and wooden surfaces on bounce boards is designed to improve coordination of player movements as well as physical response to exercise (Asri et al., 2017; Mu'ammar, 2017). Meanwhile, sports teaching and training become a solid foundation, making this bounce board an effective learning aid. This product is designed with the needs of coaches and players in mind, so that it can make a positive contribution to the development of table tennis skills and enrich the training experience of the players (Kurniawan et al., 2018; Syahara, 2019). The holistic integration of various sports theories makes this bounce board not only an ordinary training tool, but also a means of supporting development and progress in the world of Table Tennis.

CONCLUSION

The development of the bounce board has successfully improved the drive stroke in Table Tennis. The product has a thoughtful and functional design, taking into account the needs of coaches and players. With the right size, quality materials, and additional features of rubber bumpers, reflective boards, and chalk lines, bounce boards can be an effective exercise tool and provide a better workout experience. The results of assessments from table tennis experts and field trials show the success of the product in improving the quality of ball bounce, coordination of player movements and physical response to exercise. Subsequent research suggests developing more portable or foldable versions to facilitate outdoor use or in places with limited space.

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