



Modified Duo Tir as Alternative Training Media to Improve Shooting Accuracy in Petanque

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Abstract: Le Duo Tir Obut is a medium for training to improve the accuracy of shooting petanque. The price of these tools is relatively high, and they must be imported. This study aims to: (1) produce a tool in the form of a Duo Tir modification where the materials used are relatively cheap and easy to obtain, this tool is an alternative training medium to increase shooting accuracy, and (2) determine the effectiveness of using the Duo Tir modification tool to improve petanque shooting accuracy. This study used the research and development method by Borg and Gall (1983). Collecting data in this study implemented 6 data collection activities using four main instruments: observation, questionnaires, interviews, and the petanque shooting accuracy test. The results of this study are: (1) the Duo Tir modification instrument to increase the accuracy of shooting petanque both from the content and construct aspects is valid and reliable, (2) the validator's assessment of the modified Duo Tir product presents that the results of preliminary field testing and main field testing with percentage eligibility > 75% are feasible, and (3) the results of the effectiveness test show that training using the Duo Tir modification has a more significant effect than conventional training on the results of increasing the shooting accuracy of petanque athletes in Nusa Tenggara Barat (West Nusa Tenggara). Based on this explanation, it is concluded that the Duo Tir modification is feasible and effective in increasing the petanque shooting accuracy.

Keywords: duo tir, modified, petanque, shooting

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INTRODUCTION

Petanque is a type of boules game with the basic principle of delivering an iron ball as close as possible to a small wooden ball (jack) as an assessment target. Both feet must be in a circle when throwing (Lubis & Permadi, 2020). Petanque is a sport that demands visual manipulation and control skills of an object, namely the skill of throwing boules to get points by approaching the jack or getting rid of the opponent's boules (Samsudin & Low, 2018). The basic petanque technique involves pointing and shooting (Bustomi et al., 2020). The focus or object of this study is petanque shooting.

Shooting is a type of throw in a petanque game to eliminate the opponent's boules that are close to the jack (Badaru et al., 2021). Athletes have good shooting skills if every shot consistently hits and replaces the target's opponent's boules called a "carreau" or "shot on short" (Lubis & Permadi, 2020; Wahyudhi et al., 2021). According to Lubis (2019), the difficulty level of shooting is higher than pointing, therefore to produce effective and efficient shooting requires a strict training program (Lubis & Permadi, 2021), a training program that increases concentration (Agustina & Priambodo, 2017), a training program that improves good movement coordination (Nurfatoni & Hanief, 2020), and a training program that stimulates a high increase in kinesthetic perception (Rizal et al., 2020), resulting in shooting accuracy.

The results of a preliminary study in the field (Lubis et al., 2021) show that the use of the Le Duo Tir Obut tool is more effective in increasing the accuracy of shooting petanque (mean = 28.90) compared to conventional training (mean = 20.40). Le Duo Tir Obut is a special tool to practice shooting accuracy at all playing distances. The Le Duo Tir Obut tool is assembled from 2 boules made of semi-soft stainless steel connected by an elastic cord covered with rubber produced by the French manufacturer Obut (Obut, 2021). From the results of this study, it is recommended to modify the Le Duo Tir Obut tool because the price is relatively high, and it must be imported from France. This modification was made with one of the objectives to increase the number of tools so that in practice, all athletes can enjoy the training process and carry out a special training program to increase the accuracy of shooting petanque.

Increasing the number of tools requires a large amount of money to suit the needs of carrying out a particular petanque shooting training program, which is an obstacle in the field. To overcome this problem, as stated by Buszard et al. (2014), modification of equipment in sports is an attempt to manipulate existing constraints at a low cost, safely and measurably (McCrady-Spitzer et al., 2015) to achieve increased movement skills and improve participation (Buszard et al., 2020). Thus, all athletes who participate in the training program can enjoy the training process, and the long-term impact can create practice habits and develop certain

movement skills is the goal of modifying sports equipment (Brocken et al., 2020; Davids et al., 2008; Kirk, 2004). One of the effective strategies to increase sports participation and improve specific skills is modifying sports (Araújo et al., 2004; Buszard et al., 2016). Initially, modifications in sports were developed for children to provide opportunities to participate (Eime et al., 2015). However, recent research shows that modified sports have become more widespread, including modifications to equipment, rules, or playing fields (Jenkin, 2018).

There have been similar studies with modified sports equipment but in different sports, including by Arias et al. (2012). The results of the study conclude that the percentage of successful layup throws is higher using modified balls compared to balls that complied with regulations. Kachel et al. (2015) show that the use of a modified ball increases rally speed which allows players to hit the ball with a groundstroke at a lower height according to the athlete's comfort. However, ball compression has no effect on the number of forehands, backhands, first serve, and double fault strokes. Dancy and Murphy (2020) in their research results show that the number of ball hits on the bat is significantly higher when using a modified ball than a regular-sized ball. Batting performance using a modified ball played in the target area is also significantly higher than regular-sized balls. A better technique is also displayed when using a modified bat than an ordinary bat. Arias (2018) states that the highest frequency of shots and successful shots occurs when using a modified ball with a ball mass of 440 grams.

Similar research has been carried out by Irawan and Pangesti (2020) that presents that a modification of a petanque ball with a wooden medium called Bokavia is suitable for use as an alternative learning media in playing petanque. However, this research is only intended for beginners and does not specifically aim to improve petanque shooting accuracy. In contrast to these studies, the Duo Tir modification in this study specifically aims to improve the shooting accuracy of petanque athletes. The modifications made are by replacing the materials that make up the Le Duo Tir tool at a relatively low price and easy to obtain. Even though the modification to the Duo Tir tool is carried out using a relatively cheaper cost, it does not change the function of the original tool, as stated by Ranganathan and Newell (2013), modifications to sports equipment can be done without changing the function and can achieve the goal of learning skills differently.

Based on previous research, this study aims to produce a tool in the form of a Duo Tir modification where the materials used are relatively cheap and easy to obtain but do not change their original function, namely as a medium to increase the accuracy of shooting petanque.

METHODS

This research used the Research and Development (R&D) method which is carried out to make certain products and test their effectiveness (Borg & Gall, 1983) with qualitative and quantitative approaches (Creswell, 2016; Harrison et al., 2020). Research and Development (R&D) in this study used the Borg and Gall development model, which consisted of ten steps (Gall et al., 2003) including (1) Research and Information Collection, (2) Planning, (3) Developing Preliminary Form of Product, (4) Preliminary Field Testing, (5) Revising Main Product, (6) Main Field Testing, (7) Revising Operational Product, (8) Operational Field Testing, (9) Revising Final Product, and (10) Disseminating and Implementing. However, in this study, the research and development method used was simplified or only at the Revising Final Product stage (Gustiani, 2019). Research and Development (R&D) is the main character in this research, but it is carried out from existing products (Sugiyono, 2019). This study aims to develop training media in the form of tool modifications to improve the accuracy of petanque shooting at all playing distances in the petanque game. The product developed in this research is the development of an existing target shooting tool, namely Le Duo Tir Obut, by modifying the series of tools using materials that are relatively cheap and easy to obtain.

This research was carried out at several petanque training sites on the island of Lombok, West Nusa Tenggara, Indonesia, from January to December 2021. Preliminary Field Testing was carried out at the East Lombok petanque training center. Main Field Testing was carried out at Universitas Pendidikan Mandalika (UNDIKMA) petanque training center. Operational Field Testing (product effectiveness test) was carried out at the West Nusa Tenggara (NTB) petanque training center.

This research involved experts. Instrument validation was carried out by two experts in sports assessment and evaluation with doctoral degrees. The task of the experts in validating this instrument is to review the instrument designed by the researcher. The research product was validated by four experts, including one expert on petanque sports material, one expert on sports learning media/practice with a doctorate degree, and two experts/practitioners from petanque trainers with a doctorate degree and an international license for petanque trainers.

The preliminary field testing and main field testing involved four nationally licensed petanque trainers and petanque athletes in the province of NTB, including the Preliminary Field Testing involving 8 East Lombok petanque athletes, the Main Field Testing involving 16 UNDIKMA petanque athletes, and the Operational Field Testing (product effectiveness test) involving 32 NTB petanque athletes.

This research and development used instruments compiled by researchers who are validated through Focus Group Discussions (FGD) (McMillan, 2001) in the form of expert/academic validation sheets for petanque sports material, expert/academician validation sheets for sports media, expert/practitioner validation sheets, observation sheets, questionnaires, and interviews. This study used a petanque shooting accuracy test instrument (Souef, 2015) at the product effectiveness testing stage.

Data collection techniques in this research that is developing existing products, in the case of this study modifying Duo Tir, consist of 6 data collection activities (Sugiyono, 2019): (1) Phase I data collection, carried out to obtain data on the existing product (Duo Tir Obut tool) both from the performance of the tool and aspects of form/appearance, quality, and function. The instruments used were field notes from the results of experimental research conducted and open interviews. (2) Phase II data collection is carried out to determine whether the modification of Duo Tir is following the needs of the field. The instruments used were observation and interviews. (3) Phase III data collection, carried out to obtain data on the results of internal product validation testing through FGD conducted by experts and practitioners on the design/modification design of Duo Tir that has been made. The instruments used were product validation sheets and questionnaires. (4) Phase IV data collection to obtain data from preliminary field testing results. The instruments used were observation sheets and questionnaires. (5) Phase V data collection is carried out to obtain data from the main field-testing results. The instruments used were observation sheets and questionnaires. (6) Phase VI data collection is carried out to obtain operational field testing result data (effective product test). The instrument used was the petanque shooting accuracy test instrument.

Before the instrument is used in data collection in the field, the entire instrument must be validated. The entire Duo Tir modification instrument was validated to increase the accuracy of shooting petanque as many as 25 items through content and construct validity (Nieveen, 2007). Instrument validity data that the validator has assessed is then categorized, as seen in Table 1.

Table 1. Instrument Validity Criteria

Value Internal	Criteria
> 3,6	Very Valid
2,8 – 3,6	Valid
1,9 – 2,7	Invalid
1,0 – 1,8	Very Invalid

Source: (Asy'ari et al., 2018)

The reliability of the instrument uses the percentage agreement equation by Emmer and Millet (Borich, 1994). The instrument is said to be reliable if it has a percentage agreement of 75% or as much as 75% of the average score of the validator team in the valid category. Assessment techniques of preliminary form of product, preliminary field testing, and main field testing use the percentage of eligibility (Gratton & Jones, 2010) which is summarized in Formula 2, namely $P = f/N \times (100\%)$. From Formula 2, it is known that "P" is the relative frequency/percentage figure for which the percentage is sought, "f" is the frequency (number of assessment scores), "N" is the total number of data (items)/maximum score, and 100% is a constant. After the eligibility percentage is obtained, and the product is said to be eligible if the eligibility percentage is more than 75% (>75%) or is called eligible. In this case, there are 4 categories of eligibility according to the percentage of eligibility, namely eligible, fairly eligible, less eligible and not eligible. It can be seen Table 2.

Table 2. Eligibility Classification

Value Score	Description
> 75% - 100%	Eligible
> 50% - 75%	Fairly Eligible
> 25% - 50%	Less Eligible
> 25%	Not Eligible

Operational field testing (product effectiveness test) was carried out using a quasi-experimental (Creswell, 2017). The research data were analyzed statistically parametrically with the help of IBM SPSS version 23 (Santoso, 2014), including: research data processing begins with conducting a prerequisite test of data analysis using the Kolmogorov-Smirnov Test before conducting the Paired Sample T-Test, prerequisite test for data analysis using the homogeneity test and continued with Independent Sample T-Test.

RESULT AND DISCUSSION

The preliminary study in this study is the result of previous research The results of open interviews with petanque trainers in NTB recommend (1) modifying the Le Duo Tir Obut tool because the price of the tool is relatively high and difficult to obtain or must be imported from France (Obut, 2021), (2) the Le Duo Tir Obut tool has been proven to improve shooting accuracy more effectively than using conventional training tools, (3)

a large number of Duo Tir modification tools are needed so that the training program to improve shooting accuracy can be carried out more effectively and efficiently, and athletes can participate and enjoy the training process, (4) the modified Duo Tir tool must resemble the original tool in terms of appearance, quality, and function, but the assembly is easy and inexpensive and the materials used are easy to obtain. This information indicates a problem, namely the limited training equipment to increase the accuracy of shooting petanque. Therefore, based on the information collected, the researchers will modify Duo Tir to increase the accuracy of shooting petanque.

Before modifying the Le Duo Tir Obut tool, the researchers carried out a reflective process (Arias et al., 2011) regarding this tool that Le Duo Tir Obut is a special tool to practice shooting accuracy at all playing distances. The Le Duo Tir Obut tool is assembled from 2 boules with different diameters 71 (striated) and 76 (plain) made of anti-rust semi-soft steel connected with an elastic cable covered with rubber (Obut, 2021). It can be seen in Figure 1.



Figure 1. Le Duo Tir Obut

The modifications made are by replacing the materials that compose the tool at a relatively cheap price and easy to obtain by considering the appearance, quality, and not changing the function of the original tool (Bartlett et al., 2003; Ranganathan & Newell, 2013), as well as drafting instructions for the assembly and use of the Duo Tir modification tool. The specifications for the Duo Tir modification consist of materials that are relatively cheap and easy to obtain including: (1) 2 pieces of imitation boules made in China with a diameter of 72 cm and a weight of 690 grams, (2) Steel Wire Rope (wire rope sling) 35 cm long with thickness of 6 millimeters, (3) 2 pieces of mounting bolts HTM Yamaha Rx 8/8 Pcs, (4) 2 pieces Hex Nuts M.8-P1.25-K12 KNG Pcs. For assembly, drilling is carried out on boules with standard Twist Bits or Jobber drill bits with a size of 10 millimeters and welding using Nikko Steel Welding Electrodes RD-460 2.0 x 300 millimeters. It can be seen in Figure 2

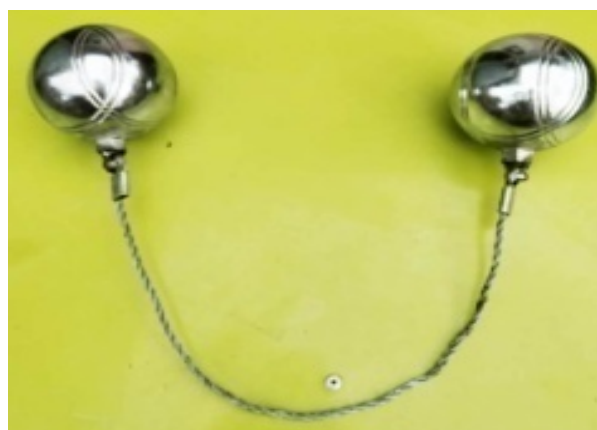


Figure 2. Preliminary Product Modification Duo Tir

Instruments used in data collection in the field such as product eligibility observation data, preliminary field, main field testing compiled by the researchers consist of expert/academic validation sheets for petanque sports, expert validation sheets/academics of sports training media, expert/practitioner validation sheets for trainers, observation sheets, questionnaires, and interviews. Instrument validation was carried out by 2 experts in the field of sports education assessment and evaluation through a Focus Group Discussion (FGD). The overall validation of the Duo Tir modified instrument to increase the accuracy of shooting petanque as many as 25 items with 3 indicators, namely display, quality, and function, is carried out through content validity and construct validity. Instrument reliability uses the percentage agreement equation. The results of the validity and reliability of the modified Duo Tir instrument to improve the accuracy of shooting petanque can be seen in Table 3.

Table 3. The results of validity and reliability of Modified Duo Tir Instruments to Improve Petanque Shooting Accuracy

Assessment	Duo Tir Modification Indicators			
	Display	Quality	Function	Reliability
Content Validity	3.2	3.55	3.6	96.03
Construct Validity	3.4	3.6	3.65	98.01

Table 3 shows the validator's assessment of the content and construct validity of the entire Duo Tir modified instrument to improve the accuracy of shooting petanque in the valid category (score range 2.8 – 3.6) and reliable, namely the percentage agreement of 96.03% and 98.01%. After validating the instrument, the next step is to validate the Duo Tir modified product through a Focus Group Discussion (FGD). In this study, the researchers use four experts including one expert/academic of petanque sports material, one expert/academic of learning media/sports training, and two experts/practitioners from petanque coaches. From the expert validation process on Preliminary Form a Duo Tir Modified Product, the researchers obtained suggestions from experts to improve Preliminary Form a Duo Tir Modified Product to increase the accuracy of shooting petanque. It can be seen in Table 4.

Table 4. Expert suggestions for Duo Tir Modified Products

Expert	Advice
Expert 1: Academics of petanque sports	<ol style="list-style-type: none"> 1. The coaching point of using the modified Duo Tir must be clearly written in the manual so that the functional aspects of this tool can achieve the expected goals. 2. The use of the modified Duo Tir is carried out by observing the trainer or partner as an evaluator so that the functional aspects of this tool can achieve the expected goals.
Expert 2: Academics of learning media/sports training	<ol style="list-style-type: none"> 1. The material used as a liaison between the two target bosses should be replaced with a material that has a higher elasticity but remains strong and durable against impact so that it does not interfere with the user's concentration during the training process. 2. Substitution and addition of materials will change the assembly technique so that this tool can later be disassembled on each component of the material used and makes it easier to assemble and repair if the use of the tool is damaged in the long term.
Expert 3: Practitioner of petanque coach	<ol style="list-style-type: none"> 1. The use of this tool in the training process should be done reciprocally so that athletes can find out the mistakes made when shooting movements. This can train the athlete's kinesthetic perception.
Expert 4: Practitioner of petanque coach	<ol style="list-style-type: none"> 1. In training using a modified Duo Tir, direct exposure to the modified Duo Tir target becomes the focus of training to produce carreau shooting or short on shoot. This can increase the athlete's concentration.

Furthermore, revisions were made to the preliminary form a Duo Tir modified product following the suggestions of the experts, namely improvements to the draft instructions for assembly and use of the modified Duo Tir and the connecting material for the modified Duo Tir. Specific changes to the connecting material for the modified Duo Tir, namely the steel Wire Rope (wire rope sling) was replaced with Spring (Per) Front Fork 3P91 Yamaha Genuine Parts and Accessories material. The revised Duo Tir modification makes the tool more practical, more durable, and can be disassembled on every component of the tool. It can be seen in Figure 3.

**Figure 3.** Modified Duo Tir

The following are the validation results of the preliminary form of Duo Tir modified products after a review of the initial product has been carried out, as seen in [Table 5](#).

Table 5. The Validation results of the preliminary form a Duo Tir modified product

Expert	Score	Maximum Score	Eligibility Percentage	Eligibility Classification
Academics of petanque sports	92	100	92	Eligible
Academics of learning media/sports training	68	72	94	Eligible
Practitioner of petanque coach ke-1	81	84	96	Eligible
Practitioner of petanque coach ke-2	79	84	94	Eligible

Based on the validation results of preliminary form a Duo Tir modified product to improve the accuracy of shooting petanque, it shows that the four experts give an assessment with eligibility percentage of more than 75% of the preliminary form a Duo Tir modified product so that it was declared eligible, this means preliminary form a Duo Tir modified product is valid and can be tested at the next stage. After getting validation by experts on the preliminary form a Duo Tir modified product to increase the accuracy of shooting petanque and has received approval for eligibility to be tested in preliminary field testing. The preliminary field testing involved four petanque coaches in the province of NTB and involved 8 petanque athletes from East Lombok. The technical implementation of the preliminary field testing was carried out based on observations of the use of the Duo Tir modified in shooting practice activities carried out by the athlete in accordance with the suggestions of the experts in the previous stage. Data were obtained from the coaches in the form of: (1) observational data on the use of the Duo Tir modified, and (2) input data on the use of the Duo Tir modified tool. The following are the results of the preliminary field testing from the trainers in [Table 6](#).

Table 6. Results of Preliminary Field Testing from the Coaches

Expert	Score	Maximum Score	Eligibility Percentage	Eligibility Classification
1st coach	79	92	85,87	Eligible
2nd coach	81	92	88,04	Eligible
3rd coach	82	92	89,13	Eligible
4th coach	85	92	92,39	Eligible

The preliminary field testing consists of 23 items with a maximum score of 92. The assessment of the coaches in the preliminary field testing gives eligibility percentage of more than 75% of the Duo Tir modified product so that it is declared "eligible". In addition to data from the coaches, response data was obtained from 8 East Lombok petanque athletes. The following is the response from the athletes in the preliminary field testing, as seen in [Table 7](#).

Table 7. Results of Preliminary Field Testing from the Athletes

Expert	Score	Maximum Score	Eligibility Percentage	Eligibility Classification
1st athlete	42	48	87,50	Eligible
2nd athlete	40	48	83,33	Eligible
3rd athlete	43	48	89,58	Eligible
4th athlete	41	48	85,42	Eligible
5th athlete	42	48	87,50	Eligible
6th athlete	41	48	85,42	Eligible
7th athlete	42	48	87,50	Eligible
8th athlete	40	48	83,33	Eligible

The preliminary field testing consists of 12 items with a maximum score of 48. From the results of the assessment in the form of responses from the athletes, it shows that the 8 athletes give an assessment with eligibility percentage of more than 75% of the Duo Tir modified product so that it is declared "eligible". From the results of the assessment on the preliminary field testing, it shows that the coaches and athletes gave the same assessment of the Duo Tir modified product that is "eligible", so it can be continued to the main field testing to see how much eligibility is obtained if the number of people try more and from a different place. Main field testing is carried out as an effort to determine the acceptance of the product in a wider scope. The main field testing also involved 4 petanque coaches in the province of NTB, but the trials at this stage involved 16 UNDIKMA petanque athletes. Similar to the previous stage, the technical implementation of the main field testing was carried out based on observations of the use of the modified Duo Tir in shooting practice activities carried out by the athlete following input from the trainers in the previous stage. Data were obtained from the coaches in the form of: (1) observational data on the use of the modified Duo Tir, and (2) input data on the use of the Duo Tir modified. The following are the results of the main field testing from the coaches, as seen in [Table 8](#).

Table 8. Results of Main Field Testing from the Coaches

Expert	Score	Maximum Score	Eligibility Percentage	Eligibility Classification
1st coach	82	92	89,13	Eligible
2nd coach	86	92	93,48	Eligible
3rd coach	85	92	92,39	Eligible
4th coach	87	92	94,57	Eligible

The main field testing consists of 23 items with a maximum score of 92. The assessment of the coaches in the main field testing gives eligibility percentage of more than 75% of the Duo Tir modified product so that it is declared "eligible". In addition to data from the coaches, response data was obtained from 16 UNDIKMA petanque athletes. The following is the response from the athletes on the main field testing, as seen in [Table 9](#).

Table 9. Results of Main Field Testing from the Athletes

Expert	Score	Maximum Score	Eligibility Percentage	Eligibility Classification
1st athlete	44	48	91,67	Eligible
2nd athlete	43	48	89,58	Eligible
3rd athlete	45	48	93,75	Eligible
4th athlete	44	48	91,67	Eligible
5th athlete	42	48	87,50	Eligible
6th athlete	43	48	89,58	Eligible
7th athlete	45	48	93,75	Eligible
8th athlete	44	48	91,67	Eligible
9th athlete	44	48	91,67	Eligible
10th athlete	46	48	95,83	Eligible
11th athlete	42	48	87,50	Eligible
12th athlete	43	48	89,58	Eligible
13th athlete	43	48	89,58	Eligible
14th athlete	43	48	89,58	Eligible
15th athlete	42	48	87,50	Eligible
16th athlete	43	48	89,58	Eligible

The main field testing consists of 12 items with a maximum score of 48. From the results of the assessment in the form of responses from the athletes, it shows that the 16 athletes gave an assessment with a eligibility percentage of more than 75% of the Duo Tir modified product so that it was declared "eligible". From the results of the assessment on the main field testing, it shows that the coaches and athletes give the same assessment of the Duo Tir modified, namely "eligible", meaning that the Duo Tir modified can be continued to the operational field testing stage (product effectiveness test). However, before testing the effectiveness of the product, the researchers must revise the product that has been produced. From the implementation process at the preliminary field testing and main field testing stages, the researchers obtained some suggestions and input from the coaches and analyzed the use of modified Duo Tir to improve shooting petanque. The revisions made refer to how the modified Duo Tir applied, the athlete's response in understanding the use of the modified Duo Tir, as well as the level of difficulty in using the modified Duo Tir to improve the accuracy of shooting petanque.

The following are some revisions to the Duo Tir modified product, including: (1) field conditioning should be considered more in training using this tool, so athletes can concentrate without distraction, namely expanding the training area using the Duo Tir modified which was originally 1 meter wide to 2 meters wide, (2) the use of the Duo Tir modified in the training process should continue to use the circle to get used to it as in the match, this can also train the kinesthetic perception of the athlete in straight parallel or straight diagonal conditions to understand the standing position in the circle to the target/modified Duo Tir, (3) the intervention of the coach's assistant or partner in the use of the Duo Tir modified must be carried out more intensely so that the shooting motion phases are more well coordinated, (4) the coach's assistant or partner should provide triggers to athletes, especially in the final phase of motion shooting (follow through), this helps athletes to remember movements, especially at different back swing speeds at different distances so as to create motion automation and produce shoot on iron, (5) the use of a Duo Tir modified is recommended for athletes who have mastered the petanque shooting technique well, (6) the use of a Duo Tir modified in training in principle is good for use up to high intensity, but without neglecting the principle of recovery to avoid injury to the arm.

The operational field testing stage (product effectiveness test) involves 32 NTB petanque athletes, where in the operational field testing (product effectiveness test), treatment was first given for 8 weeks with a frequency of exercise 5 times a week ([Fox & Mathews, 1981](#)), both for the experimental group (the use of a

modified Duo Tir) or the control group (conventional training). The research data was obtained before and after the treatment was given, then the research data was processed. Data processing begins with a data analysis prerequisite test using the Kolmogorov-Smirnov Test for normality. The basis for making a decision for the normality test uses the Shapiro-Wilk, when compared with the value $\alpha = 0.05$. The following are the results of the data normality test, as seen in Table 10.

Table 10. Normality Test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Experiment (modified Duo Tir)	,112	16	,200*	,977	16	,936
Posttest Experiment (modified Duo Tir)	,112	16	,200*	,984	16	,987
Pretest Control (conventional training)	,110	16	,200*	,961	16	,684
Posttest Control (conventional training)	,180	16	,175	,918	16	,159

The results of the pretest and posttest data for the experimental group (using the modified Duo Tir) obtained each Sig. $0.936 > 0.05$ and Sig. $0.987 > 0.05$. The results of the pretest and posttest data for the control group (conventional training) obtained each Sig. $0.684 > 0.05$ and $0.159 > 0.05$. This means that the research data is normally distributed. The requirements for using the Paired Sample T-Test are that the data are normally distributed, so that the Paired Sample T-Test can be carried out. The following are the results of the Paired Sample T-Test. It can be seen in Table 11.

Table 11. Paired Sample T-Test

		Paired Differences				
		Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1	Pretest Experiment – Posttest Experiment	-20,313	3,439	-23,624	15	,000
Pair 2	Pretest Control – Posttest Control	-6,625	2,156	-12,289	15	,000

Based on Pair 1 pretest and posttest of the experimental group (using the modified Duo Tir) obtained Sig. (2-tailed) of $0.000 < 0.05$, it can be concluded that when compared before and after being given the treatment using the modified Duo Tir, there is a significant increase or influence on the results of the shooting accuracy of the NTB petanque athletes. Based on the Pair 2 pretest and posttest control group (conventional training) the value of Sig. (2-tailed) of $0.000 < 0.05$, it can be concluded that when compared before and after being given conventional treatment, there is a significant increase or influence on the results of the shooting accuracy of the NTB petanque athletes. Both of these treatments provide an increase or influence on the results of the shooting accuracy of the NTB petanque athletes. Therefore, it is continued by conducting an Independent Sample T-Test to see if there is a difference in the increase or effect of the two treatments. But before that, a data prerequisite test must be carried out, namely the homogeneity test. The following are the results of the homogeneity test.

Table 12. Test of Homogeneity of Variance

	Levene Statistic	df1	df2	Sig.
Based on Mean	2,025	1	30	,165

The homogeneity test shows the value of Sig. Based on the Mean of $0.165 > 0.05$, it can be concluded that the variance of the experimental group's posttest data and the control group's posttest data is the same or homogeneous. Thus, one of the requirements (not absolute) of the Independent Sample T-Test has been fulfilled. The following are the results of the Independent Sample T-Test.

Table 13. Independent Sample T-Test

	F	Sig.	t	df	Sig. (2-tailed)
Equal variances assumed	2,025	,165	8,052	30	,000

The Independent Sample T-Test shows the value of Sig. (2-tailed) of $0.000 < 0.05$, it can be concluded that there is a difference in the increase or effect of shooting accuracy between the experimental group (using the Duo Tir modified product) and the control group (conventional practice). To see how big the difference in the effect of the experimental group's exercise using the modified Duo Tir with the control group using conventional training on the accuracy of shooting for NTB petanque athletes, it can be seen in group statistics in Table 14.

Table 14. Group Statistics

Group	N	Mean
Post-test Exerimental (Modified Duo Tir)	16	36,19
Post-test Control (conventional training)	16	22,38

The results of the accuracy of shooting in the experimental group (using the modified Duo Tir) obtained a mean value of 36.19 and the results of the accuracy of shooting in the control group (conventional training) obtained a mean value of 22.38. So it can be concluded that training using the modified Duo Tir has a greater effect than conventional training on the results of the shooting accuracy of the NTB petanque athletes. In other words, the use of the modified Duo Tir is more effective in increasing the shooting accuracy of the NTB petanque athletes than conventional training.

The final product resulted from this research is in the form of a modified Duo Tir equipped with an assembly manual and the use of a modified Duo Tir tool to increase the accuracy of shooting petanque which is packaged into three parts consisting of: (1) the materials needed to assemble the Modified Duo Tir, (2) modified way of assembling Duo Tir, (3) the use of modified Duo Tir in the practice program improves the accuracy of shooting petanque. The two validators' assessment of the modified Duo Tir instrument to increase the accuracy of shooting petanque both from the content and construct aspects shows a valid category (score range 2.8 - 3.6) and reliable for the two assessment components respectively, namely the percentage agreement of 96.03% and 98.01%, indicating that the agreement between experts is high (Borich, 1994; Gallais et al., 2017; Hendryadi, 2017). Furthermore, the evaluation of the four validators on the Duo Tir modified product with a percentage of eligibility of more than 75%, namely 92%, 94%, 96%, and 94%, has high consistency and feasibility (Jones & Gratton, 2014; Taber, 2017).

The results of the validation by experts on the Duo Tir modified product to increase the accuracy of shooting petanque were declared feasible, where the assembly and use of the Duo Tir modified tool are more practical and the materials used are more durable, and one advantage that the original tool does not have is that the Duo Tir modified tool can be disassembled in case of damage. However, the drawback of the Duo Tir modified tool is that it is easily corroded in long-term use because the materials that make up this tool are not made of stainless steel like the original tool.

In addition, the product effectiveness test results show that the use of the Duo Tir modified tool has a greater effect compared to conventional training on increasing shooting accuracy. In addition, the modified Duo Tir has the same function and performance as the original tool (Le Duo Tir) which has been proven in previous studies (Lubis et al., 2021). This is following the recommendations of research conducted by Badaru et al. (2021) and Sutrisna et al. (2018) that the use of varied equipment with attention to comfort can make athletes more effective and efficient in increasing shooting accuracy. So far, research that specifically modifies training tools for petanque games is bokavia (Irawan & Pangesti, 2020). Bokavia aims to provide an alternative media game by modifying the petanque ball, which is cheaper, lighter, practical, and attractive but follows petanque game standards. However, this research is only intended for beginners and does not specifically aim to practice petanque shooting accuracy. In contrast to these studies, the modified Duo Tir in this study specifically aims to improve the shooting accuracy of petanque athletes.

The shooting practice uses the modified Duo Tir where athletes shoot at the ideal playing distance, starting from the closest distance of 6 meters to the furthest distance of 10 meters, directing athletes to be more concentrated and demanding good movement coordination. As stated by Agustina and Priambodo (2017), obtaining maximum value in shooting petanque requires high concentration. Furthermore, Andriyani et al. (2020) and Lubis and Permadi (2021) state that a high level of concentration will produce good movement coordination. Meanwhile, Hutabarat et al. (2017) argue that athletes who have good concentration will form a level of consciousness or kinesthetic perception, namely measuring visually between the modified Duo Tir target distance, arm swing strength, and throwing angle (Purnomo & Yendrizal, 2020; Reina et al., 2018) by having good kinesthetic perception helps athletes know the correctness of the movements being carried out so that it has a big influence on increasing petanque shooting. Verhoeven and Newell (2016) state that good shooting results from good eye-hand coordination, the eyes are the main function and the hands make movements at the behest of the brain so motion automation will be created.

The results of this research are one of the sports development programs specifically on the development of tools and facilities. As stated by Hancock et al. (2013), sports equipment tailored to the needs of several things develops in several countries following sports development programs. Where the development of sports equipment including the modification of sports equipment is one of the supports for achieving sports achievements, as stated by (Christopher et al., 2015) that one of the absolute conditions for the achievement of sports achievements is the availability of equipment and facilities according to needs and scientific development.

CONCLUSION

Based on the research results, the product produced is in the form of a Duo Tir modified tool to improve the accuracy of shooting petanque and assembly instructions and the use of the Duo Tir modified tool. This is because validators have assessed the Duo Tir modified product with a feasibility percentage of > 75% which has a high level of feasibility and consistency. The product effectiveness test results show that the use of the Duo Tir modified tool has a greater influence compared to conventional training on increasing the shooting accuracy of petanque athletes in West Nusa Tenggara, so the use of the Duo Tir modified tool is a variation and alternative form of training to improve petanque shooting accuracy. This study recommends further research to examine the effect and consistency of using the Duo Tir modified tool to increase the accuracy of shooting petanque at the stages of athlete development in West Nusa Tenggara.

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