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Development of modified shotput devices: how are the Orthodox and Obrien styles implemented?

Heru Sulistianta[1*], Fitri Agung Nanda[1], Hauzan Ariq Abdurarahman[2]
[1]Department of Physical, Health and Recreation Education, Faculty of Teacher Training and Education, Universitas Lampung, Jl. Prof. Dr. Ir. Sumantri Brojonegoro, Gedong Meneng, Kec. Rajabasa, Bandar Lampung City, Lampung 35145, Indonesia
[2]Uluslararası ilişkiler Selçuk üniversitesi, Mah. Yeni İstanbul Cad No:369 Selçuklu-Konya 42130, Türkiye
* Corresponding Author. E-mail: heru.sulistianta@fkip.unila.ac.id

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Abstract: The development of shotput media is one way that physical education teachers can maximize learning outcomes. The research aims to reveal the development of the results shotput modification tool and the results of the implementation effectiveness modified tool through the orthodox and Obrien styles. This research uses the development of Borg and Gall and effectiveness test research. The modified tool was assessed by material, and media experts and has been tested with the results to be presented in the sub-subexplanation explanation results and discussion. Furthermore, after the results are obtained regarding the appropriate modification tools that can be used, the effectiveness test of the two forces in the shotput is carried out. The research subjects were 30 seventh-grade students of SMP Negeri 17 Sungailangka Gedong Tataan, Pesawaran Regency. Analysis data was used in this study using the Ancova test which was carried out to see the rest difference in repulsion forces. Then perform the N-Gain Test to determine the effective application of two repulsive forces. The results revealed that the modified tool developed in both learning and effectiveness tests revealed that the developed tool had a significance of 0.00 > 0.05. The average orthodox force n-gain test increased by 0.44 which means that the N-Gain has increased. The results of the O'Brien style N-Gain have an average of 0.19 increase in learning outcomes using tool modifications. Based on the results, it can be concluded that there is a significant effect in the use of tool modifications on the ability to put down and place bullets using Orthodox and O'brien styles.
Keywords: modification, tool, shout up, orthodox, o'brien.

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INTRODUCTION

Shotput is a branch of the athletic sport that is taught in physical education learning in schools. Maksum, (2021) said that putting a shotput is one part of athletic sports that is always taught in schools. Ishak et al., (2021) in athletics learning one of the materials that must be given is learning about shotput. He continued, it was revealed that in every preparation of the RPP based on the syllabus from the Ministry of shotput, it is an athletic material that must be taught in schools. Sultoni (2021) expatriates that the bullet put learning material is always applied based on the syllabus that is prepared for learning at school. Chakraborty, (2021)that says if that sport of shotput is a sport in which a person does a push witan and with the calculation made in this sport is the distance from the ground the bullet made in the throw. Limbong et al., (2021) revealed that the sport of shotput is a sport in which the bullet is repelled as far as possible. He continueexplainingned that the repulsion made must be with one hand and thrown as far as possible. Warniati et al., (2022) revealed that the shotput is part of the throwing number that has the power to push or hold a bullet or metal ball using a certain technique as far as possible from the point of departure to the point of landing using a certain technique.

Anggriawan et al., **(**2022) explain that the development of tools as learning media is very important to be used for successful learning. Although it is one of the mandatory materials in every physical education learning, especially athletic sports, in its application there are several obstacles found

in the sport of shotput. (Kok et al., 2020) a shot-puttechnique rating scale was developed together with a track and field teacher of windesheim applied University for Physical Education (located in Zwolle, the Netherlands) andae a team of PE teachers of the secondary school that was involved in this study and was based on existing rating scales for dutch. Utami, **(**2019) explains that there are very few infrastructure facilities iforthe shotput learning in every schowhichthis hinders learning success and maximum scores in every shotput lesson. Ardiyanto & fajaruddin, **(**2019) the implementation of research-based health education in schools is still considered to be in the early stages early and needs more development to carry on**.**

Nofriantoni, (2021) in learning to put a bullet in schools many obstacles occur including tools, media and learning m,odels. Shotput learning in schools does not get meaningful interest for students, this is because students feel that the sport of putting bullets is not fun or that the shotput props are inadequate so they have to take turns playing it**.** Orhan et al., **(**2021) Based on the literature review, it was revealed that difficulties in learning to put a shot in schools were caused by adequate facilities and infrastructure. Research on tool modification in shotput learnthe ing has been carried out to support learning success. Alphius, **(**2021) explains that the development of tools in the sport of shotput is one of the factors in supporting the success of learning at school. Nicole & Waldman, **(**2022) revealed that the infrastructure in schools for athletic learning, especially shotput, is very lacking so that physiducation teachers are expected to be able to develop creativity so that they can procancation tools that support learning success so that they get maximum results. Rani, **(**2020) explains that shooting facilities are very limited, (2) this sport is individualistic, (3) learning methods are less varied, (4) students feel anxioand and afraid of bullets.

Based on the results of a literature review as well as a discussion of problems in the shotput learning and the modification of tools in learning. Based on the results of the literature study as well as discussion of problems in shotput learning and modification of tools in learning in the articles that have been published and calculated in the paragraph above regarding the results of learning that put the results of a literature review on tool modification usually only describe the results of expert tests in its development. This is what underlies this research regarding the modification of tools and the application of the modified tools directly to the force e in the shotput, namely orthbrainnd obrien. This study has a sufficient level of novelty compared to the results of previous research which only presented the results of expert tests. This study aims to determine the test results of the modification of the tool and the effectiveness of the implementation of the tool in an orthodox and obedient style in learning shotput, especially in class VII SMP Negeri 17 Sungailangka Gedong Tataan, Pesawaran Regency

METHODS

The research used R&D development research using Borg and Gall method that developing and validating educational products. The steps of this process are usually referred to as the R & D cycle, which consists of studying research findings pertinent to the product to be developed, developing the product based on the finding, field testing it in the setting where it will be used eventually, and revising it to correct the deficiencies found in the field test stage. The t product determined to meets the objectives, then after it has been developed and obtained modification results, implementation or application will be carried out which will later be tested for the effectiveness of the tools used in Orthodox and O'brien shotput styles. Modification of the tool used was the use of plastic balls filled with cement with a weight that is adjusted to the needs and provisions of bullet puts for junior high school students. This modified tool was assessed by means rial, media experts and has been tested. Furthermore, after obtaining the results regarding the appropriate modification to that can be used, the effectiveness test is carried out on the two styles that are often used in the shotput. The subjects of this study were students of class VII SMP Negeri 17 Sungailangka Gedong Tataan (n=30), Pesawaran Regency. The analysis of the data used in this study using the ANCOVA test. It was carried out to see the results of the differences in the ability to put bullets used in students. The gain test is used to determine how strong the effect of the application of the two repulsive forces is. The effectiveness procedure is carried out by performing repulsion with a modified bullet developed in the orthodox and obrien style. Rejection of the orthodox and o'brien styles was carried out 3 times.

RESULTS AND DISCUSSION

Tool Modification Test Results

The results in this study are in the form of an exercise model for putting down bullets using modified bullets that have been made by researchers to improve students' shotput abilities. In making the modification of the bullet used in this study, it was validated by two experts, namely material experts and media experts. The results of the material expert assessment are presented in Table 1.

Table 1. Material Expert Assessment

Assessment Aspect	Criteria	Percentage	Value
Material Quality	20	80%	Good
Benefit for Teachers	9	90%	Very good
Benefit for the Rest	8	80%	Good
Total number	37	82.2%	Very good

Based on Table 1, the percentage of validation results obtained with a value of 20 and 80% in good category. Furthermore, the assessment of the aspect of usefulness for teachers obtained a value of 9 with a percentage of 90% in the very good category. The results of the assessment of the usefulness aspect for students with a score of 8 and a percentage of 80% are categorized as good. The total assessment of material experts as a whole with a value of 37 percentages of 82.2% is categorized as very good, so it can be concluded that the modification of the tool to be used is "Very Good/Decent".

Table 2. Media Expert Assessment

Assessment Aspect	Criteria	Persentage	Value
Physique	12	80%	Good
Use Implication	21	84%	Very good
Total number	33	82.5%	Very good

Based on Table 2, the results of the assessment from media experts for tool modification in learning shotput in the physical aspect obtained the percentage of validation results with a value of 12 and 80% in good category. Furthermore, the assessment of the aspect of use obtained a value of 21 with a percentage of 84% in the very good category. The results of the assessment of media experts as a whole with a value of 33 percentages of 82.5% categorized as very good, it can be concluded that the modification of the tool to be used is "Very Good/Decent.

Results of Implementation

After the media to be used is declared feasible, it is continued by analyzing the results of the Orthodox and O'brien style training using a modified tool to improve the ability to put bullets in Class VII students of SMP Negeri 17 Sungailangka Gedong Tataan, Pesawaran Regency. The comparison results obtained from the pre-test and post-test data carried out are shown in Table 3.

Table 3. Comparison of Results of Orthodox and O'brien Styles

Measurement	Pretest	Posttest	Difference
Ortodoks	6.38	6.91	0.53
O’brien	6.10	6.55	0.45

The results of the average measurements in the Table 3 show that the difference in the average scores in the orthodox style is 0.53 while the O'Brien style analysis is 0.45. Data analysis was carried out to determine the level of effectiveness of the force used in shotput practice using a modified tool on the students' shotput ability. Analysis of the data used in this study used prerequisite tests, namely normality test and homogeneity test. Prerequisites were carried out before carrying out the Ancova test. The Ancova test was carried out to see the results of the difference in the shotput force used on the student's shotput ability. The normality test has a purpose, namely to determine whether the relevant sources are normally distributed or not. The normality test in this study used SPSS 20. Table 4 shows

the results of the normality test for the pretest and post post-test put abilities in the orthodox style and the O'Brien style.

The results of the mean measurement in the Table 3 show that the difference in the mean scores of the Orthodox style is 0.53, while the analysis of the O'Brien style is 0.45. Data analysis was carried out to determine the level of effectiveness of the force used in shotput, by repelling using a modified bullet. Analysis of the data used in this study using the required tests: normality test and homogeneity test. Preliminary testing was carried out before the Ancova test. The Ancova test was carried out to see the results of the differences in the firing styles used on the students' bullet points.

Table 4. Normality Test

	Shapiro-Wilk		
	Statistic	df	Sig.
Pre-orthodox	.980	30	.830
Post-orthodox	.962	30	.355
Pre-o'brien	.979	30	.798
Post-o'brien	.970	30	.533
*. This is a lower bound of the true significance.			
a. Lilliefors Significance Correction			

Based on the Table 4, it can be concluded that the normality test of students' shotput ability in the pretest and posttest from the Orthodox style and the O'Brien style can be interpreted if the significance value is higher than 0.05 then the data is not normally distributed and the overall data is normally distributed.

Table5. Homogenitas Test

	Levene Statistic	df1	df2	Sig.
Pretest	.044	1	58	.834
Postest	.000	1	58	.987

The homogeneity test was used to determine whether the subjects of the Orthodox and O'Brien styles had the same variance. The results of the homogeneity test on the pre and post tests have a significance value of > 0.05, so the data is homogeneous variance. After carrying out the required tests, the hypothesis can be tested using the ANCOVA test to see if there are differences in the results of the Orthodox style and the O'Brien style when using aids adapted to students' shotputs.

Table 6. Ancova Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	29.059[a]	2	14.530	52.103	.000	.646
Intercept	5.395	1	5.395	19.348	.000	.253
VAR00001	27.065	1	27.065	97.053	.000	.630
VAR00002	.336	1	.336	1.205	.277	.021
Error	15.895	57	.279			
Total	2764.144	60				
Corrected Total	44.955	59				

By the calculation of the hypothesis using the Ancova test with Univariate which shows a significance result of 0.00 < 0.05 (See Table 6) which states that Ho is rejected and Ha is accepted. It can be concluded that there is a significant difference between Orthodox and O'brien styles in the use of modified tools on the ability to shoot bullets of class VII students of SMP Negeri 17 Sungailangka Gedong Tataan, Pesawaran Regency. The N-Gain test is used to determine how strong the effect of the application of the two repulsive forces is. The formula used in the n-gain test is the hake formula, while the results of the n-gain test are shown in Table 7.

Tabel 7. N-Gain Test

Gaya		Pretest	Postest	N-Gain
Ortodoks	Mean	6.3840	6.9143	.4414
	N	30	30	29
	Std. Deviation	.97035	.84761	.55809
O'brien	Mean	6.0973	6.5497	.1994
	N	30	30	30
	Std. Deviation	.86447	.87347	.42857

The results of the experimental class n-gain test show that the average orthodox power has increased by 0.44, which means that the n-gain has increased in the medium category. Meanwhile, the results of the normality test for the o'brien style gain have an average of 0.19, meaning that the n gain also increases in the small category. Based on the results of the research, the orthodox and o'brien styles can improve shotput through the use of modified tools. The success of this study was supported by the increase in the results from pretest to posttest, so that it can be seen that there are significant differences in the use of tool modifications when carried out in the orthodox and o'brien styles. Data analysis shows that the results of using custom tools using the Orthodox style have a higher level of effectiveness than using the O'brien style.

Tool modification test

Based on the results of the tool modification test, it was found that the modification of the tool, using a plastic ball filled with cement, the size and weight were adjusted to the needs of class VII SMP students, and it was found that the modification of the tool was feasible to be used as an alternative media to replace bullet put infrastructure. This media is considered very good and can be made independently by students to be able to get maximum learning outcomes for the bullet put material. If it is associated with the results of a literature review regarding the development or modification of the tool, it has several similarities.

Usman et al., (2019) that tool modification is one way for physical education teachers to be able to maximize learning outcomes. It was explained that if the modified material was made of color balls measuring 6 cm in diameter, then split or given a hole the size of a stone into which cement would be inserted, is one of the media that greatly influences the results of shotput learning. Mislan & Santoso, (2019) development of tools or other shotput modifications that are felt to be able to improve learning outcomes and the enthusiasm and motivation of students is through practical tools (bullets) with lighter, neater and attractively colored yarn materials. For elementary school children, modified bullets made of rubber also have sizes and weights but are different from the original iron bullets (Yova & Dewantoro, 2019).

Hardana, (2021) explains that in addition to modifying the delivery model and modifying training, it is one way to improve shotput learning outcomes. Putra et al., (2022) revealed that tool modification is one way to see how the level of creativity of physical education teachers is through ways to develop in the sport of shotput which is applied to students. Aziz & Utomo, (2021) explains that if the use of firewood ash ball media has been proven to improve Orthodox style shotput learning, it is in line with what the research, and this media can help all physical education teachers, especially bullet material. Budiarsono, (2022) reveals that innovative learning requires a teacher to find new things in learning physical education, sports and health.

Implementation of Orthodox style with tool modification

Based on the results of the effectiveness test of the implementation of the modification of the cement ball apparatus in the orthodox style through the Ancova test and the n-gain test, the results obtained are 0.55809, it can be concluded that through the modification of the cement-filled ball apparatus, it can improve the learning outcomes of shotput in the orthodox style. Saputra et al., (2021) said that the orthodox force is a repulsive force that is carried out with a sideways prefix. The orthodox style is one of the most frequently used styles in the sport of shotput. The orthodox style is performed with the prefix sideways. Saputra continued, it was explained that this style often results in maximum throws in the sport of shotput (Putra et al., 2022). Parry et al., (2021) applied the orthodox style with the development of a modified tool through a rubber ball that was able to produce stronger power to

maximize the arms and muscles so that the results of the shotput were maximized and determined the success of learning.

Febrianto, (2021) orthodox style using a modified baseball device is rejected by a sideways (orthodox) shotput technique by relaying to a circular target in front of it until it enters. Asmoro, (2021) orthodox style performed without a prefix requires arm muscle strength, and back strength by using a modified tool, which can maximize the overall components of supporting the bullet repulsion. Sumaeda, (2019) said that if collaborative learning in the form of that can be applied in the shotput learning process, it can create a situation for students who are active and responsible in the learning process so that learning objectives can be achieved. Ad'dien et al., (2020) revealed that the explanation of the sideways shooting technique is as follows: several basic techniques must be considered in hitting, including how to hold the ball, how to shoot on the shoulder, how to start, how to do sideways shooting movements.

O'brien style implementation with tool modification

Based on the results of the effectiveness test of the implementation of the modification of the cement ball apparatus in the orthodox style through the Ancova test and the n-gain test, the results were 0.42857. It can be concluded that through the modification of the cement filled ball apparatus, it was able to improve the learning outcomes of shotput in the obrein style. Gunadi, (2021) explains that O'brien's technique or backstroke has been the model for all other variations of technique in modern shooting. Even today, the o'brien style technique still uses all the techniques used by an athlete who excels both at national and international levels and is also taught today in schools and athletic clubs. Budiarsono, (2022)says if the modification of the tool using a baseball can increase the ability of the obrein-style shotput.

Yuliana, (2021) revealed that the drill method is one way to increase the results of bullet repulsion. The o'brien style requires courage and attention to every stage of the movement, the obrien style is a modern style that is currently often used from other styles in the sport of shotput. Alphius (2021) explains that plastic balls and colored necklaces can increase the repulsion of bullets using the obrien force. The learning model and the modification of playing baseball are the right tools to improve the ability of the obrein style shotput sheet (Kristina, 2019).

CONCLUSIONS

Based on the results of data analysis carried out, it can be concluded that there is a significant effect in the use of tool modifications on the ability to put down and place bullets using Orthodox and O'brien styles. This research showed that the use of tool modification is effective in shotput learning. The results of this study are to add references and insights for academics, practitioners, and physical education teachers so that they can produce modification tools that support learning success so that they get maximum results. The novelty of the research is that the modified tool that has been developed is directly applied to the Obrien and orthodox style model in the shotput learning, the modification tool used is also environmentally friendly and can be made and seconded for demonstrations at home. The limitation, in this case, is that this research can further test the effectiveness of this product on a wider scale and carried out up to the stage of the product marketing process.

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