



The Effect of Circuit Training Exercises and Set Systems on Learning Motivation Towards Discus Throw Results of Students of SMP Negeri 2 Pendalian IV Koto

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Article Info

Article History :

Received : May 2023

Revised : June 2023

Accepted : June 2023

Keywords:

Circuit Training,
Discus Throw
Learning Motivation,
Set System,

Abstract

The Problem of this research is that the schools observed have never excelled, especially in discus throwing competitions, both at the district, provincial and national levels. There are still many students whose throwing results are below the discus throwing. The lack of maximum student throwing results is due to the lack of student arm muscle power when throwing. This research is to see the effect of circuit training and training systems in terms of learning motivation on discus throwing results. This study uses an experimental method with a factorial design with a level of 2x2. The population of this study was male students of SMP Negeri 2 Pendalian IV Koto, totaling 74 people and number of samples from all treatment plans was 40 people, based on group division 27% high learning motivation level and 27% low learning motivation level. The learning motivation instrument is measured by angle. The data obtained were analyzed using two-way ANOVA and Tukey's test with a significance level of $\alpha = 0.05$. The final results : (1) Overall there is a difference in the effect of circuit training and the discus throwing circuit training method. (2) There is an interaction between circuit training methods and system set training with learning motivation on the discus throwing results (3) There are differences in the results of discus throwing given the circuit training method and set system training at high learning motivation. (4) There are differences in the results of throwing discus given the circuit training method and set system training at low learning motivation.

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ISSN 2685-6514 (Online)

ISSN 2477-331X (Print)

INTRODUCTION

Sport at this time is an activity that cannot be separated from human life individually or in groups. Besides that, sport is a human physical activity in the formation of a whole person, who is physically and mentally healthy and has a good mental attitude. Therefore, coaching in the field of sports is very closely related to life in society, nation and state. Physical education sports coaching is a series of physical activities of playing and sports to build students who are healthy and strong so as to produce high achievements (Donnelly et al., 2016). Sports education as one of the compulsory subjects in the world of education in Indonesia is also regulated in the Constitution of the Republic of Indonesia Number 3 of 2005 concerning the National Sports System (UU No 3 Tahun 2005) : "Sports education is physical education and sports carried out as part of an organized and continuous education process to acquire knowledge, personality, skills, health and physical fitness". To achieve all of this requires hard work from all parties, both from the government or related agencies, from the school, teachers and from the students themselves. Success in the field of education is largely determined by the teaching and learning process. The teaching and learning process is a series of communication activities between humans, namely between people who learn or are called students and people who teach are called teachers. In the teaching and learning process the teacher will face students who have different abilities and characteristics so that a teacher will never be separated from the learning problems of his students, because learning outcomes are a measure of the results of students' ability to receive lessons at school. Physical education is one of the subjects taught in schools

starting from elementary school to high school (Sotos-Martínez et al., 2023). Sports activities not only make the body fitter, but can also help refresh the mind so that it can help and support students in the learning process (Yuldashev, 2021). Lots of sports are taught in schools, one of which is athletics. Athletics is one of the oldest sports, which has been practiced by humans since ancient times until today.

"Athletics comes from the Greek, namely Athlon or Athlum which means competition and struggle" According to Zikrur Rahmat in (Anto Sukamto et al., 2022). While people who do it are called athletes. The development of the world of sports, especially athletics, is currently experiencing very rapid progress. This is proven by the many events that are held both nationally, regionally and internationally. Athletics is one of the sports that competes and includes, among others: street numbers, running, jumping and throwing. One of the throwing numbers contested is the discus throw. Discus throwing has a very large position in Education in Junior High Schools because discus throwing is included in the athletic numbers contested in the Kompetisi Olahraga Siswa Nasional (KOSN) apart from sprinting, long jump and shot put. As we know, the basic techniques of discus throwing both with spin and without spin that need to be mastered include disc holding techniques (Anto Sukamto et al., 2022), starting techniques, arm swing techniques when throwing discs and final movement techniques after throwing or releasing discs. In throwing discs, the components of physical condition needed are power or explosive power of the arm muscles and flexibility of the pelvic muscles (Umar, 2014). The most important physical condition is the power or explosive power of the arm muscles and flexibility. According to Badriah in (Ambarwati et

al., 2017) Arm muscle power is the ability of a muscle or group of arm muscles to contract explosively in a short time. The better the arm muscle power of a discus throwing athlete, the farther the throw will be. In addition, the physical component that plays a role in discus throwing is flexibility (Badr, 2023). According to Badriah in (Millah, 2018) flexibility is the ability to move joints. The above quote explains that flexibility is the body's ability to perform a wide range of joint movements which are influenced by the shape of the joints, muscles, tendons and ligaments. Flexibility in this study meant the ability of the hip joints to stretch as much as possible when making circular movements.

Based on the results of observations made by researchers at SMP Negeri 2 Pandalian IV Koto, there were several factors that influenced the results of discus throwing, including: the schools that the researchers observed had never had any achievements, especially discus throwing, at the district, provincial and national levels. This is because when students make throws, the results or distances obtained by students are not maximized. There are still many students who get throwing results below the discus throwing assessment norms. The lack of maximum student throwing results is due to the lack of student arm muscle power when throwing. Power is needed to get good throwing results. In addition, the student's body, which is less flexible, also causes the throw to be less than optimal. Flexibility is also needed in discus throwing. This happens because there is no specific training given to train students' arm muscle power and flexibility. Students should be given muscle power exercises arms and flexibility to get maximum results. To train arm muscle power, students can provide circuit training exercises or

exercises with system sets (Putri et al., 2020).

As we know, circuit training is a type of interval training program in which strength training is combined with aerobic exercise, which also combines the benefits of flexibility and physical strength (Nasrulloh, 2015). "Circuit" here means several sports groups or posts that are in an area and must be completed quickly where each participant must complete one post first before going to another post. Circuit training aims to develop and improve physical fitness related to strength, speed and endurance (Aryatama, 2022). In addition to the circuit training method, a method that can be used to train power and flexibility is the system set training method. According to Harsono in (Mariati & Rasyid, 2019) the set system training method is an exercise that uses several repetitions of a form of exercise followed by a period of rest, then repeats the original repetition (same movement), some do 2 sets for a form of exercise, some do 3 sets. In addition to paying attention to the specific exercises given to improve discus throwing results, it is also necessary to pay attention to student motivation. It can be seen that when the observation took place, students were less motivated in carrying out discus throwing movements. The lack of motivation of students in carrying out this discus throwing movement may be because discus throwing is considered less interesting than sports games. Based on the description above, the researcher is interested in raising this problem into a study with the hope that the results of this research can contribute to solving the problems faced by students of SMP Negeri 2 Pandalian IV Koto in learning to throw discs.

METHODS

According to Barlian (Susianti, 2018) that causal comparative research is to examine causal relationships by comparing groups. The group in this study referred to is A^1B^1 which is called the group of circuit training training methods with high learning motivation, A^1B^2 is called the circuit training training group with low learning motivation. A^2B^1 is called the system set training group with high learning motivation, A^2B^2 is called the system set training group with low learning motivation. This experimental study used two groups that received different treatments, namely the circuit training method and the system set method.

Participants

This research was conducted at SMP Negeri 2 Pendalian IV Koto which is located at Jalan Ekonomi No. 12, Bengkolan Salak, Pendalian IV Koto District, Rokan Hulu Regency, Riau. The population in this study consisted of all male students of class VII, VIII, and class IX of SMP Negeri 2 Pendalian IV Koto, totaling 74 people. The sample grouping was carried out with the first step, namely measuring learning motivation for all members of the population, so that it became 4 groups, training methods for circuit training exercises with high learning motivation totaling 10 people (A^1B^1) and in the training method group for system set training with high learning motivation collected 10 people (A^2B^1), then in the method for circuit training exercises with low concentration there are 10 people (A^1B^2) and in the method for system set training with low concentration there are 10 people (A^2B^2). According to Sugiyono in (Noeraini, 2016) that in principle, research is measuring, so there must be a good measuring instrument. Measuring tools in research are usually

called instruments. The test instrument used in this study was an initial test (pre-test) which was carried out before students received treatment in the form of a circuit training training method and a system set training method and a post-test, namely after students received training. The test instrument used was the discus throwing test. The data analysis used in this study was a two-way analysis of variance (ANOVA) technique, and further tested using the Tukey test, the requirements analysis of variance (ANOVA), namely the normality test and homogeneity test.

RESULT

In this section, a description of the results of discus throwing at SMP Negeri 2 Pendalian IV Koto will be presented, which are the results of measurements of all research subjects. Based on the experimental research design conducted, there are 8 groups of members whose discus throwing scores need to be described separately. The following is a description of the results of the discus throwing results from the 8 groups.

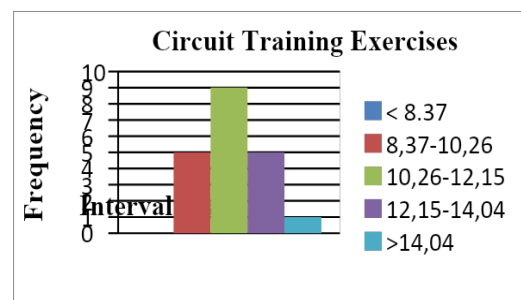


Figure 1. Diagram of Discus Throwing Results Given Circuit Training

Based on Figure 1, it shows that in the interval class <8.37 there are 0 people (0%) who are in the very poor category, in the interval class $8.37 - 10.26$ there are 5 people (25%) who are in the less category, in the interval class $10.26 - 12.15$ there were 9 people (45%) who were in the

medium category, in the interval class 12.15 - 14.04 there were 5 people (25%) who were in the good category and in the interval class > 14.04 there was 1 person (5 %) is in the very good category.

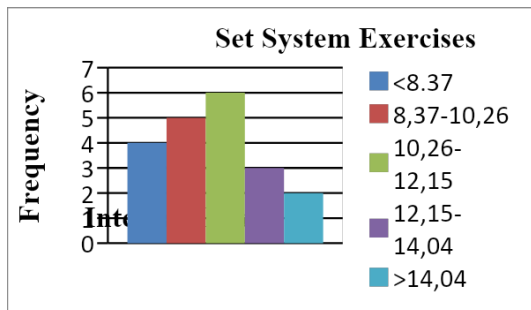


Figure 2. Diagram of Disc Throw Results Given Practice Set System (A^2)

Based on Figure 2 above, it shows that in the interval class <8.37 there are 4 people (20%) who are in the very poor category, in the interval class 8.37 - 10.26 there are 5 people (25%) who are in the less category, in the interval class 10 .26 - 12.15 there were 6 people (30%) were in the medium category, in the interval class 12.15 - 14.04 there were 3 people (15%) were in the good category and in the interval class > 14.04 there were 2 people (10 %) is in the very good category.

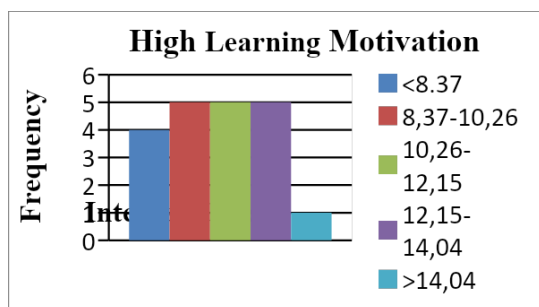


Figure 3. Disc Throw Results Diagram for High Learning Motivation Category (B^1)

Based on Figure 3 above, it shows that in the interval class <8.37 there are 4 people (20%) who are in the very poor category, in the interval class 8.37 - 10.26 there are 5 people (25%) who are in the

less category, in the interval class 10 .26 - 12.15 there were 5 people (25%) who were in the medium category, in the interval class 12.15 - 14.04 there were 5 people (25%) who were in the good category and in the interval class > 14.04 there was 1 person (5 %) is in the very good category.

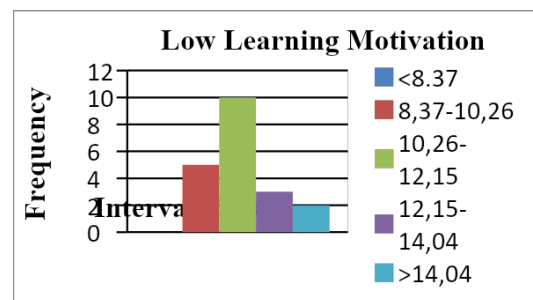


Figure 4. Disc Throw Results Diagram for Low Learning Motivation Category (B^2)

Based on Figure 4 above, it shows that in the interval class <8.37 there are 0 people (0%) who are in the very poor category, in the interval class 8.37 - 10.26 there are 5 people (25%) who are in the less category, in the interval class 10 .26 - 12.15 there were 10 people (50%) were in the medium category, in the interval class 12.15 - 14.04 there were 3 people (15%) were in the good category and in the interval class > 14.04 there were 2 people (10 %) is in the very good category.

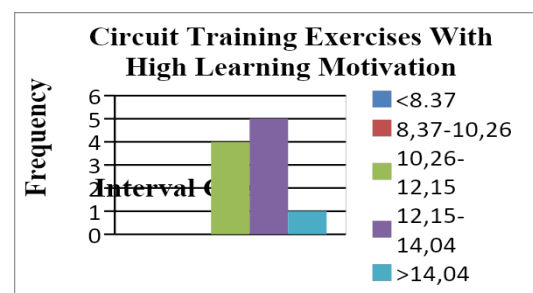


Figure 5. Diagram of Disc Throwing Result Given Circuit Training with High Learning Motivation Category

Based on table 4.5 above, it shows that in the interval class <8.37 there are 0 people (0%) who are in the very poor

category, in the interval class 8.37 - 10.26 there are 0 people (0%) who are in the less category, in the interval class 10.26 - 12.15 there were 4 people (40%) who were in the medium category, in the interval class 12.15 - 14.04 there were 5 people (50%) who were in the good category and in the interval class > 14.04 there was 1 person (10%) is in the very good category.

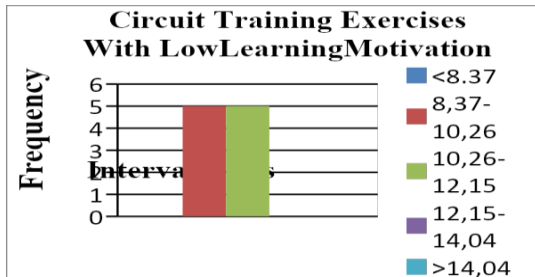


Figure 6. Diagram of Discus Throwing Result Given Circuit Training Exercise with Low Exercise Motivation Category

Based on Figure 6 above, it shows that in the interval class <8.37 there are 0 people (0%) who are in the very poor category, in the interval class 8.37 - 10.26 there are 5 people (50%) who are in the less category, in the interval class 10.26 - 12.15 there were 5 people (50%) who were in the medium category, in the interval class 12.15 - 14.04 there were 0 people (0%) who were in the good category and in the interval class > 14.04 there were 0 people (0%) is in the very good category.

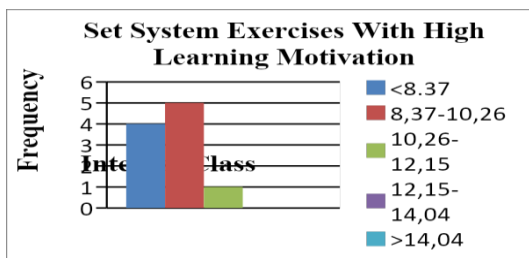


Figure 7. Discus Throw Result Diagram Given Set System Practice with High Motivation Category

Based on Figure 7 above, it shows that in the interval class <8.37 there are 4 people (40%) who are in the very poor category, in the interval class 8.37 - 10.26 there are 5 people (50%) who are in the less category, in the interval class 10.26 - 12.15 there is 1 person (10%) is in the moderate category, in the interval class 12.15 - 14.04 there are 0 people (0%) are in the good category and in the interval class > 14.04 there are 0 people (0%) is in the very good category.

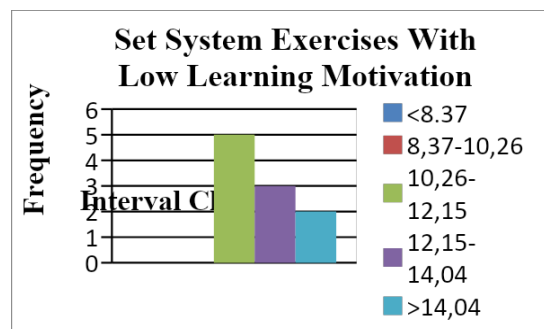


Figure 8. Discus Throw Results Given Set System Exercises With Low Motivation Category

Based on Figure 8 above, it shows that in the interval class <8.37 there are 0 people (0%) who are in the very poor category, in the interval class 8.37 - 10.26 there are 0 people (0%) who are in the less category, in the interval class 10.26 - 12.15 there are 5 people (50%) are in the medium category, in the interval class 12.15 - 14.04 there are 3 people (30%) are in the good category and in the interval class > 14.04 there are 2 people (20%) is in the very good category.

Table 1. Disc Throw Result Normality Test

Group	n	L_o	L_t	Conclusion
A ₁	20	0.037	0,19	Normal
A ₂	20	0.053	0,19	Normal
B ₁	20	0.079	0,19	Normal
B ₂	20	0.045	0,19	Normal
A ₁ B ₁	10	0.077	0,258	Normal
A ₁ B ₂	10	0.049	0,258	Normal
A ₂ B ₁	10	0.117	0,258	Normal
A ₂ B ₂	10	0.080	0,258	Normal

The normality test for the eight research design groups above, it was found that the $L_{\text{observation}}$ (L_o) value obtained was smaller than the L_{table} value at the 0.05 significance level. Thus it can be concluded that all data groups in this study were taken from normally distributed populations so that they could be used to test the research hypothesis.

Table 2. Summary of Group Variance Homogeneity Test Results A¹ and A²

Conclusion of Homogeneity Test Test F				
Group	Variance	F_h	F_t	Information
A ₁	2,41	1,99	2.16	Homogen
A ₂	4,80			

Based on the results of statistical calculations, the largest variance (S^2) is 4.80 and the smallest variance is 2.41. The homogeneity index of variance between the two groups tested (F_c) was 1.99, while F_t (0.05 : 20.20) was 2.16, thus $F_c < F_t$, which means that H_o is accepted. The results of the complete calculation of the homogeneity test can be seen in table 2. In other words, it can be stated that the two groups tested, namely groups A¹ and A², were homogeneous.

Table 3. Summary of Group Variance Homogeneity Test Results B¹ and B²

Source of Variance	JK	db	RJK	F_{count}	F_{tabel}	Info
	$\alpha=0,05$					
Exercise Approach (A)	6,23	1	6,23	5,28	4,08	Sig
Motivation (B)	5,10	1	5,10	4,33	4,08	Sig
Interaction AB	89,46	1	89,46	75,92	4,08	Sig
Internal Error	42,42	36	1,18	-	-	
Total	143,20	39	-	-	-	

The two groups being compared, the largest variance (S^2) is 4.75 and the smallest variance is 4.52. The homogeneity index of variance between the two groups tested F_c was 1.88 while F_t (0.05 ; 20.20) = 2.16. Thus $F_h < F_t$ which means that H_o is accepted. The results of the complete calculation of the homogeneity test can be seen in Table 3. In other words, it can be stated that the two groups tested, namely groups B¹ and B², were homogeneous.

Table 4. Summary of Homogeneity of Variance Test Results for the Four Study Design Groups

Group	Separate Variances	Variance Ga	Value B	X^h	X^t	Information
A ₁ B ₁	1,09					
A ₁ B ₂	1,10	1,175	2,52	0,483	7,815	Homogen
A ₂ B ₁	0,99					
A ₂ B ₂	1,52					

By paying attention to Table 4 , it can be seen that H_o is accepted ($X^2_{\text{count}} < X^2_{\text{table}}$). This means that there is no difference in variance between the four groups tested or in other words that the four long jump data groups tested are homogeneous.

Table 5. Summary of Two-Way ANOVA Results to Data on Discus Throwing Results

Conclusion of Homogeneity Test Test F				
Group	Variance	F _h	F _t	Information
B ₁	4,75	1,88	2,16	Homogen
B ₂	2,52			

Based on the results of statistics on Table 5, the main influences in this study are; (1) the effect of circuit training and system set training on discus throwing results, (2) While the interaction effect is a combination of training approaches and training motivation on discus throwing outcomes.

Table 6. Advanced Stage ANOVA Results With Tukey's Test

Comparison Group	Qh	Qt (= 0.05)	Info
A ₁ B ₁ and A ₂ B ₁	11,02	3,88	Significant
A ₁ B ₂ and A ₂ B ₂	6,41	3,88	Significant

By proving the research hypothesis above which states that there is an interaction between the circuit training method and system set training with learning motivation on the discus throwing results of students at SMP Negeri 2 Pendalian IV Koto, the analysis needs to be continued with the Tukey Test. Complete calculation of the Tukey test.

DISCUSSION

After analyzing the data using the two-way ANOVA approach and followed by Tukey's test of the four proposed research hypotheses, the four hypotheses are accepted and can be verified. The research findings as stated in the previous section are the results of statistical data analysis that need to be studied further in order to be able to explain the research hypotheses that are accepted as true, why

there can be a significant interaction between the training approach and learning motivation, and so on. Based on the interaction data, the treatment group obtained the highest average score of discus throwing. This research was conducted on junior high school students, the majority of whom already have maximum discus throwing skills in throwing, this is what supports the circuit training approach to be better than system set training, besides that it is supported by data using a two-way ANOVA test. The results obtained are $F_{count} = 5.28 > F_{table} = 4.08$ which states that the data is significant and the truth is accepted empirically and the hypothesis previously proposed is accepted. From the results of the two-way ANOVA analysis, it shows that $F_{count} = 75.92 > F_{table} = 4.08$, it can be understood that the proposed hypothesis is accepted empirically, that there is an interaction between the training approach and learning motivation, where the training approach influences success in throwing as well as high category motivation or low will determine the formation of discus throwing results, if this motivation is adjusted to the form of training needed by students of SMP Negeri 2 Pendalian IV Koto by considering all aspects both internal and external then efficiency will be created in training to realize the goal of increasing discus throwing skills in obtaining performance.

In the high category of learning motivation caused several things including: (1) effective and efficient use of energy, (2) increased muscle mass and tissue activity as a result of weight training, (3) strong and diligent encouragement in training (high training motivation), and (4) regulation good nutrition and rest, this is the trigger for the increase in discus throwing results of students of SMP Negeri 2 Pendalian IV Koto compared to the system set training approach, in this training model students do not only focus

on arm muscle power but also have to focus on other techniques because The approach taken is to do the exercises in a portioned manner, so that the objectives of the exercise are not optimally fulfilled. This presentation is supported by statistical results with a follow-up test, namely the tukey test which states that from the results of the average distance traveled in the discus throwing results of the students of SMP Negeri 2 Pendalian IV Koto the group learning motivation is in the high category with the circuit training approach $A^1B^1 = 12.74$ meters farther than the system set training approach with high learning motivation category $A^2B^1 = 8.96$ with a score ($Q_h = 11.01 > Q_t = 3.88$). So it can be understood that the hypothesis put forward previously was accepted as empirically correct that in the high category of motivation the circuit training approach is better than the system set training approach. The results of the research findings are supported by the opinion of Gunarsa in (Kuswanto, 2012) "Motivation is also included in the theory of hedonism where in essence humans will choose activities that cause them to feel happy" Likewise in sports, someone will only choose activities that are interesting and profitable for him and will consider those that are not interesting.

The facts in the field show that athletes who have low category motivation tend to follow the system set training approach with an interesting series of movements. This presentation is supported by the statistical results with the follow-up test, namely the tukey test which states that from the results of the average throwing distance in the discus throwing results of the students of SMP Negeri 2 Pendalian IV Koto, the learning motivation group is in the low category with the system set approach $A^2B^2 = 12.66$ further and gives a significant effect of the circuit training approach to learning motivation in the low category $A^1B^2 = 10.46$ with a value ($Q_h =$

$6.41 > Q_t = 3.88$). So it can be understood that the hypothesis put forward previously was accepted as empirically correct that in the low motivation category the system set training approach is better than the circuit training approach.

CONCLUSION

Based on the research findings and discussion of the research results, it can be concluded as follows: (1) Overall, there are differences in the effect of circuit training and discus throwing circuit training methods. (2) There is an interaction between the circuit training method and the system set training with learning motivation on the results of discus throwing. (3) There are differences in the results of discus throwing given the circuit training method and set system training at high learning motivation. (4) There are differences in the results of discus throwing given the circuit training method and the set training system at low learning motivation.

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