The Effect of The Strength of Extremity and Motivation on Forward Roll of Achievement Learning

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Abstract

The aims this research to determine whether there is influence of upper extremity strength, lower extremity strength and motivation on forward roll of achievement learning. The type of this study is a correlational survey involving independent variables consisting of upper extremity strength, lower extremity strength and motivation while the dependent variable is forward roll of achievement learning. The research sample was 40 students from SMK Layoa Bantaeng who were taken by purposive random sampling. The research instrument was arm muscle strength test using push and pull dynamometer, leg muscle strength test using leg dynamometer, and motivational questionnaire as well as forward roll process instruments. The results showed that there was a significant effect of upper extremity strength on forward roll of achievement learning ($p < 0.05$), there was a significant effect of lower extremity strength on forward roll of achievement learning < 0.05), there was a significant effect of motivation on forward roll of achievement learning ($p < 0.05$) and there is a significant effect together of upper extremity strength, lower extremity strength and motivation on forward roll of achievement learning ($p < 0.05$).

How to Cite

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INTRODUCTION

Gymnastics is a physical activity that can help optimize the development of individual movements. The movements in gymnastics are very in accordance with physical education programs, especially the physical demands required such as having the strength and endurance of the muscles of all members of the body. In addition, mastery of gymnastics contributes to the development of the basic movements of other sports, for example, how to control attitudes and movements effectively and efficiently. Rhythmic activity in physical education learning can be used as a tool to develop gesture orientation, so children have multilateral body abilities (Febrianta, 2018).

For learning patterns in High School (SMK), the main target is directed towards achieving educational goals, namely students are expected to have high affective and cognitive and fitness values without ignoring their motion skills. In the implementation of gymnastic learning, the material is adjusted to the level of each, in order to develop understanding and skills in applying the concepts of motion, so that this is what distinguishes competitive gymnastics. In physical education subjects floor gymnastics taught, are not fixated on the mastery of existing skills, because skills are only used to increase student mastery in their own bodies, while increasing students› understanding of the underlying principles of motion. For example the learning experience given or the expected results are recommended to sleep on your back, straight legs, lift both legs with the expected results is to provide an experience of anatomical motion and attitude, and increase the strength of the upper limb muscles and stomach and learn to practice concentration.

The main floor gymnastic skills discussed in the roll movement can only be achieved through the process of learning repetitive motion techniques. In the process of learning floor gymnastics, besides the movement techniques it is also necessary to be supported by components of physical conditions which include strength, speed, flexibility, balance, endurance, resistance, reaction, coordination and agility. Because the physical condition is a unit of components that cannot be separated, both increasing and maintaining it. This means that every effort to improve physical conditions must be in line with developing all these components. The strength of the external muscles and the shape of the front teeth are things that cannot be ignored in the floor gymnastics, especially forming the ability to roll forward on floor gymnastics (Latuheru, 2011).

Fahrizal›s (2013) study found that there was a significant contribution of arm strength, forward-to-hole determination, and lower external strength to the ability to roll forward on floor gymnastics. Not all components of the physical condition affect the forward roll movement. So there are components of the predominant physical condition that can be predicted that have to do with the forward roll movement, namely the strength of the extremity and the mental aspect is the motivation.

Based on the results of observations made on learning in Layoa Vocational Schools, most students seem to lack interest and participate in gymnastic learning compared to other physical education practice materials. Though gymnastics is the basic material that must be mastered by students. In order to improve the front roll chase, teachers should train students more often with various methods, even in a simple level, where students will be able to find new knowledge, acquire concepts and skills, so students succeed or are able to overcome their shortcomings (Rohanto, 2018)

Related to that, other conditions are exacerbated if the minimum standard is for students to be able to do movements like a roll forward perfectly and must get a perfect score. This learning demand is difficult to achieve, because in physical education that is prioritized is mastery of competence, which is in carrying out roll material in the future, paying attention and judging is a movement process (the initial stage with standing up, then slowly the body is bent forward so that both palms hands are on the mat with straight knees, then the elbows are bent towards the outside side of the body so that the head will be carried along and the chin is tightly closed to the upper chest, then the fingertips reject the body forward and roll over and support the body, which at the stage the end of the lower extremity is bent and tries to stand firm like the initial phase with the upper limb extended to the top.

Educators are required to pay attention to the basics of roll forward such as the phase of the prefix, the advanced phase and the final phase. The elements of the basic roll forward technique are expected to enable the lecturer to identify various types of factors that can affect the roll forward process when the repulsion is like the initial phase with the upper extremity extended upward.

A variety of obstacles that cause the optimal results of the roll forward process include less legs rejecting the body towards the front, the upper extremities less pushing the body towards the top and lack of motivation to carry out. In

line with the results of the observation, it was identified that the lack of learning outcomes was greatly influenced by a lack of physical abilities, namely the strength of the upper extremities and the strength of the lower extremities; and mental aspects, namely motivation. In fact, by having a strong upper limb muscle that allows the results of learning to roll forward will be done better because it will help the repulsion process, while the lower extremity muscles are able to maintain balance and rest on well and help boost the body.

The strength of the upper limb muscles is a very important component to improve the overall physical condition. Muscle strength is needed by the body because: 1) strength is the driving force for every physical activity, 2) strength plays a very important role in protecting athletes from possible injuries, 3) and the strength of athletes will help strengthen joint stability (Wahyuningsih and Raharjo, 2015) Strong muscles can protect the joints that surround it and reduce the possibility of injury due to muscle activity (Jannah and Rizky, 2018). There are several things that can be done to prevent injury (patellar tendinitis), including proper heating techniques, avoid excessive activity, rest and recovery, balance exercises, stretching exercises, muscle strengthening exercises around the knee, proper use of footwear, strapping use and taping, as well as improving game engineering skills (Boroh and Cahyani, 2016).

He upper limb has muscles which are active tools so as a source of strength for the body. The upper limb muscles consist of coracobrachialis, biceps, triceps, brachialis, brachioradialis, deltoid, palmaris longus, flexor carpi ulnaris, flexor carpi radialis, flexor digitorum superficialis, flexor pollicis longus, pronator quadratus, extensor carpi radialis longus, extensor carpi radialis, extensor carpi radialis longus, extensor carpi ulnaris, supinator, abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus. In addition to the power of the upper extremes, the strength of the lower extremities also gives a big role when going forward. The muscles that play a role in the front roll are the gluteus maximus muscle, the adductor muscle, the quadriceps lateral muscle, the medial quadriceps muscle, the anterior tibial muscle, the gastrocircum muscle, the peroneus longus muscle, the soleus muscle, the extensor digitorum longus muscle. The strength of the lower limb muscle contraction in the roll forward plays a role in rejecting the first leg towards the front so that it can do the rolling position as soon as possible. Without a strong lower limb muscle it is impossible to produce a body rotation to its original position.

In addition to the aspect of strength, mental aspects, namely motivation, are predicted

to be needed so that students are always able to have motives from within and outside themselves so they are not awkward and try to be able to do roll forward movements perfectly. Saleh and Syahruddin (2017) stated that motivation is a process that determines the level of activity, intensity, consensus, and general direction of human behavior. With regard to this, the motivation of a person or student will emerge a feeling of willingness to achieve goals, meaning that when students carry out physical activities in learning, for example high-motivation gymnastics will be able to provide good roll forward results.

In the world of physical education and sports, motivation is the desire to get pride in what has been achieved and this is called high achievement (need for achievement). Motivation as a psychological element that encourages someone to take certain actions. One motive is learning outcomes as things that affect conditions that can be successfully influenced. Therefore, educators must know the person and the environment that can affect the motivation of students.

METHOD

This type of research is a correlational survey and carried out at Bantaeng Layoa Vocational School. The population was layoa vocational students with a sample of 40 people selected randomly. The independent variables are upper external strength, lower external strength and motivation while the dependent variable is the result of learning roll forward. The instruments of this study were upper limb strength tests, lower external strength tests, motivational instruments and roll learning outcomes test instruments. Data analysis techniques used correlation regression test with a confidence level of 95%.

RESULTS AND DISCUSSION

Table 1. Summary of Descriptive Data on Upper Limb Strength, Lower Limb Strength, Motivation and Future Roll Learning Outcomes

Statis-tik	Power Upper limb	Power Lower extrem-ities	motiva-tion	Roll ke depan
N	40	40	40	40
Mean	35.938	118.462	124.4	21.85
SD	6.697	12.149	8.955	8.955
Mini-mum	24.5	95.5	110	14
Maksi-mal	51.5	143	140	27

Based on the summary of descriptive analysis of results in Table 1, the upper external strength variable can be described with an average value of 35,938 with a standard deviation of 6,697, a minimum value of 24.5 and a maximum of 515. Lower strength variable average value 118,462 with a standard deviation of 12,149, a minimum value of 95.5 and maximum of 143. Motivation data, from 40 total samples obtained the average value obtained 124.4 with standard deviation 8,955, minimum data 110 and maximum 140. For roll learning outcomes data ahead, out of 40 total samples obtained the average value obtained 21.85 with a standard deviation of 3,142, a minimum data of 14 and a maximum of 27.

Based on the results of simple linear regression analysis of the upper extremity strength (X1) on future roll learning outcomes (Y) produces a constant (a) of 10,574 with regression direction coefficient (b) = 0,305. Thus between the strength of the upper extremes with the results of the future roll learning obtained a regression equation diperoleh = 10,574 + 0,305 X1. For the linearity regression test results of forward roll learning (Y) on the upper external strength variable (X1), obtained Fcount (Tc) = 0.502 (p-value = 0.933> 0.05) this means that Ho is accepted. Thus it can be concluded that the form of the regression equation $\hat{Y}$ = 10,574 + 0,305 X1 is linear. While the regression significance test obtained Fcount 45.252, and p-value = 0,000 <0.05. This means that Ho is rejected, so that shows that the form of the regression equation $\hat{Y}$ = 10,574 + 0,305 X1 is significant.

The constant value of 10,574 in the regression equation above is a fixed value, which gives the meaning that if the upper power strength variable is 0, then the forward roll learning result has a value of 10,574. Furthermore, the regression coefficient which is positive 0.305 means that there is an effect that is directly proportional to the strength of the upper extremity to the results of learning roll forward. That is, each increase in one upper extremity strength score will be followed by an increase in the roll learning outcome score of 0.305 at the constant 10.574.

Table 2. Summary of Test Correlation Coefficients between the strengths of the upper extremes with the results of learning roll forward

Total Observation (n)	Correlation coefficient (ry1)	R Square	Fhit
40	0.737	0.544	45.252**

From the results of the test calculation the significance of the correlation coefficient is known F count = 45.252 (sig = 000 <□ = 0.05). Based on these results, the correlation coefficient between the upper external forces and the forward roll learning outcomes (ry2) of 0.737 is significant. The coefficient of determination obtained for the contribution of the upper external power to the future roll learning outcomes is 0.432 (43.2%). implying the influence of the upper external power on the roll learning outcomes ahead of 43.2%.

Based on the results of simple linear regression analysis between the lower external forces (X2) on the future roll learning outcomes (Y) produces a constant (a) of -0.738 with a regression direction coefficient (b) = 0.191. Thus, between the lower external forces and the future roll learning outcomes, the regression equation $\hat{Y}$ = -0.738 + 0.191 X2 is obtained. For linear regression test results of forward roll learning (Y) on lower power strength variables (X2), obtained Fcount (Tc) = 0.696 (p-value = 0.777> 0.05) this means that Ho is accepted. Thus it can be concluded that the form of the regression equation $\hat{Y}$ = -0.738 + 0.191 X2 is linear. While the regression significance test obtained Fcount 45.252, and p-value = 0,000 <0.05. This means that Ho is rejected, so that the form of the regression equation $\hat{Y}$ = -0.738 + 0.191 X2 is significant.

The constant value of -0.738 in the regression equation above is a fixed value, which gives the meaning that if the lower extremity strength variable is 0, then the roll learning outcomes ahead have a value of -0.738. Furthermore, the regression coefficient which is negative 0.191 means that there is an effect that is directly proportional to the strength of the lower extremity to the results of the learning roll going forward. That is, each increase in one lower extremity strength score will be followed by a decrease in the roll learning outcomes score of 0.191 in the constant -0.738.

Table 3. Summary of the Correlation Coefficient Test between the lower external forces and the results of learning roll forward

Total Observation (n)	Correlation coefficient (ry1)	R Square	Fhit
40	0.737	0.544	45.252**

From the results of the calculation of the significance test the correlation coefficient is known F count = 45.252 (sig = 0.000 <□ = 0.05).

Based on these results, the correlation coefficient between lower external strengths with forward roll learning outcomes (ry2) of 0.737 is significant. The coefficient of determination obtained for the contribution of lower external strength to roll learning outcomes for the future is 0.544 (54.4%), implying the influence of lower external strength on roll learning outcomes going forward at 54.4%.

Based on the results of a simple linear regression analysis between motivation (X3) on future roll learning outcomes (Y) produces a constant (a) of -11.418 with a regression coefficient (b) = 0.267. Thus, between motivation and future roll learning outcomes, the regression equation is obtained $\square$ = -11.418 + 0.267X3. For the linearity regression test results of forward roll learning (Y) on the upper extremity strength variable (X1), obtained Fcount (Tc) = 0.696 (p-value = 0.777> 0.05) this means that Ho is accepted. Thus it can be concluded that the form of the regression equation $\square$ = -11.418 + 0.267X3 is linear. While the regression significance test obtained Fcount 45.252, and p-value = 0,000 <0.05. This means that Ho is rejected, so that the form of the regression equation $\square$ = -11.418 + 0.267X3 is significant.

The constant value of -11.418 in the regression equation above is a fixed value, which gives the meaning that if the upper power strength variable is 0, then the forward roll learning result has a value of -11.418. Furthermore, the regression coefficient is negative 0.267 which means there is an effect that is directly proportional to the strength of the upper extremity to the results of the learning roll going forward. That is, every increase in one upper extremity strength score will be followed by a decrease in roll learning outcomes scores in the future of 0.267 in the constant -11.418.

Table 4. Summary of Test Correlation Coefficients between motivations with learning outcomes roll forward

Total Observation (n)	Correlation coefficient (ry1)	R Square	Fhit
40	0.762	0.581	52.654**

From the results of the calculation of the significance test the correlation coefficient is known F count = 52,654 (sig = 0.000 <$\square$ = 0.05). Based on these results, the correlation coefficient between motivation and future roll learning out-

comes (ry3) of 0.762 is significant. The coefficient of determination obtained for the contribution of motivation to roll learning outcomes in the future is 0.581 (58.1%). implying the influence of motivation on roll learning outcomes going forward at 58.1%.

Based on the results of multiple regression analysis between upper extremity muscle strength (X1), lower limb muscle strength (X2) and motivation (X3) with forward roll learning results produce a constant (a) of -11,545 with regression direction coefficient for upper limb muscle strength (b1) = 0.145, for lower limb muscle strength (b2) = 0.076 and motivation (b3) = 0.153. From the regression equation it can be concluded that $\square$ = -11.545 + 0.145X1 + 0.076X2 + 0.153X3 is significant. The conclusion is based on the assessment of Fcount = 36,047 and p-value = 0,000 <0,05. This means that Ho is rejected.

Table 5. Summary of the Correlation Coefficient Test between Muscle Strength of Upper Limbs, Muscle Strength of Lower Limbs and Motivation with Roll-Up Learning Outcomes

Total Observation (n)	Correlation coefficient (ry1.2.3)	Determination coefficient (ry1.2.3)	Fhit
40	0,866	0,750	36.047**

The calculated F value is 36,047 (sig = 0,000 <$\square$ = 0,05) so it can be concluded that the correlation coefficient between upper extremity muscle strength, lower limb muscle strength and motivation together with forward roll learning outcomes has a correlation coefficient (Rx.1.2.3.y) = 0.866 is significant. With the correlation coefficient, it can be seen that the determination coefficient of R Square = 0.750 (75%). This means that the effect of roll forward learning outcomes can be explained by the strength of the upper limb muscles, lower limb muscle strength and motivation by 75%.

The results of data analysis and hypothesis testing that have been stated previously, show that of the four hypotheses proposed, all were accepted and showed a significant effect.

The first hypothesis; there is a significant effect on the strength of the upper extremity on the results of learning roll forward. This influence is due to the relationship between the forward roll movement and the upper extremity strength. From the roll movement to the front, one of them is the movement of the hip which performs a bent stance rotation and then rolls with both hands on

the mattress. At that time the round togok movement occurs, the upper extremity muscles help to push the weight so that it simplifies and beautifies the forward roll movement due to the wide amplitude movement in the wide bowl giving relief from the strength of the upper limb muscles.

From several roll movements forward, one of them is the movement of both hands propping up on the mat while both elbows are bent and chin folded touching the chest, then pressing while the nape is placed or touching on the mattress, when there is static (isometric) movement in the upper extremities, and muscles the one that works is biceps and triceps brachi. But the more dominant is the triceps brachi muscle. Then when doing push ups the muscles that work are triceps brachi. Thus there is a similarity in muscle contraction when the hands support the waist by doing push ups. For this reason, it can be concluded that the strength of the upper limb muscles with the ability to do the roll support each other.

In order to be used as a guide for trainers and sports coaches, that arm muscle strength and front knuckle shape are things that cannot be ignored on the floor gymnastics, especially forming the ability to roll forward on floor gymnastics (Latuheru, 2011)

Second hypothesis; there is a significant influence on the lower extremity strength on the results of roll learning in the future. The existence of this influence is due to the association between forward roll movement with lower external forces. The lower extremity is the main task of being an equilibrium position on the body and as a weight support when starting to do a roll forward movement. Learning outcomes, lower extremities can push the body forward due to having strength. Therefore, the strength of the lower extremity is the support for obtaining good movement in the forward roll on the floor gymnastics.

Third hypothesis; there is a significant effect of motivation on the results of learning roll forward. Evident from the results of the analysis, the probability value (sig) is smaller than $\square$ 0.05. The forward roll movement requires physical aspects, but before the movement needs to be supported by non-biomotoric aspects, including motivation. With the main motivation from within will provide confidence and curiosity to be able to do as well as possible. So that with a few repetitions the roll will eventually be done.

The results of research conducted by Rohanto (2018) In order to improve the front roll chase, teachers should train students more often with various methods, even in a simple level, where students can later find new knowledge, acquire concepts and skills, so students succeed or are able to overcome shortcomings

The fourth hypothesis: From the results of testing the fourth hypothesis which shows that there is a significant simultaneous influence between the strength of the upper limb muscle, lower limb muscle strength and motivation towards the results of learning roll forward. These results further reinforce the results of testing the first, second and third hypotheses. Thus the strength of the upper limb muscles, lower limb muscle strength and motivation can be good predictors of future roll learning outcomes. That is, if the strength of the upper limb muscle, lower limb muscle strength and motivation are categorized good, then it can be ascertained that the learning outcomes of roll forward will be better. The results of the research by Rindawan and Mulyajay (2016) state that the strength of the arm muscles (upper limb) has a positive impact with regard to the energy source for the results of the wax stance. Strong muscles, especially the upper extremity muscles for students will be able to determine the ability to behave in a candle, and with the strength of a person will be able to develop endurance. The upper extremity muscle is a source of energy because this part of the body is the origin of all movements or connections that stabilize all the movements that pass through it. Therefore, the upper limb muscles play an important role in the implementation of the wax stance movement.

In addition to the physical components in gymnastic learning, motivation from students is also very expected so that they can carry out roll movements in the future efficiently and effectively. As the results of Aritonang's research (2008) that interest and motivation in improving student learning outcomes. Firmansyah's research (2009) concluded that there was a positive relationship between achievement motivation and physical education learning outcomes. Or the higher the achievement motivation the higher the physical education learning outcomes.

Thus, in foward roll material gymnastics learning it can be argued that the strength of the upper limb muscle, lower limb muscle strength and motivation have a large influence on the results of future roll learning, although there are still other factors that influence it. This is evidenced by the coefficient of determination of the contribution of upper limb muscle strength and lower extremities and the motivation together towards the future roll learning outcomes reaches 75%

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CONCLUSION

Based on the results of the study that there is a significant influence on the upper extremity of the forward roll learning outcomes there is a significant effect of lower external strength on forward roll learning outcomes , there is a significant effect of motivation on roll learning outcomes going forward, and there are influences significant strength of the upper extremity, lower external strength and motivation towards the results of forward roll learning.

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