International Journal of Multicultural and Multireligious Understanding

Assessment of Basic Locomotor Movement Skills for Elementary School Students Using Puzzle Test

Eka Fitri Novita Sari[1]; Moch. Asmawi[2]; Firmansyah Dlis[2]; Nofi Marlina Siregar[2]; Widiastuti[2]; Rekha Ratri Julianti[3]

[1] Postgraduate, Universitas Negeri Jakarta, Moh Hatta Building, Jakarta, Indonesia

[1, 2] Physical Education, Universitas Negeri Jakarta, Jakarta Timur, Indonesia

[3] Physical Education, Universitas Singaperbangsa Karawang, Karawang Barat, Jawa Barat, Indonesia

Abstract

Assessment of basic locomotor movements for elementary school students using Puzzle Test is a study to see the achievement of 8 basic locomotor movement skills for elementary school through motion observation instruments in the form of tests as puzzle games. The purpose of the study was to find the influence of game treatment in improving the basic locomotor movement skills on public elementary school students with the total number of participants was 32. The quantitative data analysis was carried out through The pre-experimental design used using a one-group pretest-posttest design approach. Data collection is was conducted through pre-test and post-test which the pre-test result was obtained with a minimum value = 9, maximum value = 24, mean = 16.6, a standard deviation = 3.92, Lcount normality test (0.0680) < Ltable (0.1542) which was normal, while the post-test minimum value = 17, maximum value = 23, mean = 19.9, standard deviation = 1.48, Lcount normality test (0.0806) < Ltable (0.1542) which was normal as well. Including T count = 0.177 and table T value = 2.042 then H0 rejected, HA accepted. Therefore, the pre-test value was not the same with the post-test value which meant the average post-test value was higher than the pre-test value. It can be concluded that the game treatment improves 8 basic locomotor movement using a test in the form of a puzzle game that can be proven empirically.

Keywords: Fundamental Locomotor Movement; Elementary Students; Puzzle Game

Introduction

Physical education and health are related to each other. Physical education is an investment in improving a person's health because of the physical activity he does [1]–[3]. At elementary school age, physical education also has this role [4, 5]. Physical activities carried out by children at elementary school age are listed in the physical education curriculum with various teaching materials, one of them is basic movement material. Basic movement skills support children's participation in various physical activities

and their movement literacy [6]. Various physical activities carried out by children are also directly proportional to improving basic movement skills [7]. Basic motion is moving, stability motion and motion that uses objects for certain purposes where these skills become the basis for children to carry out various physical activities, sports and other motion activities [8]. Thus, through teaching activities in the school, physical education seeks to equip students in various movement skills, becomes an investment in their health, and activities that are structured in such a way for improving children's motivation to do fun teaching activities [9].

Teachers try to provide stimulation of the entire sensory system in children because the coding of information that enters visually and verbally into knowledge will be stored and used later [10]. Therefore, teacher stimulation in fun teaching activities is designed in such a way that learning outcomes become more effective and efficient [11, 12]. The achievement of student learning outcomes during the teacher's teaching process is an activity that is no less important. Do not let the teaching that is carried out only seeks to complete the material contained in the unit of the lesson plan that has been prepared. The process that has been run in accordance with the goals that have been set, with the learning outcomes obtained by students, this is important for teachers to do. The results of student learning assessments are carried out for evaluation and improvement of further activities.

Research related to the achievement of teacher teaching activities through interventions in various ways and forms has been widely carried out. Veldmen and the team [6], recommend the inclusion of basic movement material into the physical education curriculum as it is a valuable experience for children to increase their physically active activities. A study conducted by Behan and the team [13] in Ireland highlighted gender differences in the mastery of basic movement skills in elementary school age and underlined that energetic and varied activities are needed for mastering basic movement skills in children of that age. Asiimwe and the team have also discussed the availability of facilities, trained personnel, adequate equipment, and school participation in increasing the effectiveness of physical education activities in schools. All of these components can motivate children to be involved in their learning activities [14].

According to the results of study literature, it is necessary to conduct research on different subjects and materials based on the applicable curriculum. The form of teaching activities in elementary schools in the age range of 7-9 years illustrate how teachers are still fixated on monotonous activities and are still limited in movement activities variations, especially new basic locomotor movements in walking, running and jumping activities. The minimum allocation of time that is usually designed by the teacher with two meetings at school requires a good strategy on how various basic locomotor movement skills can be provided with the allocated time. In theory, at this age, various kinds of locomotor movements should be mastered properly in accordance with the stages of development of children's movements at that age, starting from running, walking, jumping, sliding, skipping, galloping, jumping, and leaping. [15]. Playing activity is a method or approach that can be chosen by physical education teachers [16] especially if it is done at elementary school age [17–19]. Thus, teachers are expected to be able to design their teaching activities by providing 8 kinds of basic locomotor movement activities in a minimal allocation of teaching activities.

The limited exploration of basic locomotor movements carried out by the teacher through monotonous and unvaried activities in the provision of materials can result in decreasing children's interest to actively participate in movement activities. Through this study, the authors tried to intervene through various active play activities that would explore 8 basic locomotor skills, thus the learning achievement of basic locomotor movements for children aged 7-9 years was in accordance with supporting theory and the applicable curriculum.

This is done continuously by the authors to find evidence in areas and objects that are always different, therefore the problems found in the field can have solutions. What forms of playing activities

can be given to students at elementary school age? Are playing activities proven to improve student skills? The authors see the need to do further to prove those questions.

Material and Methods

Assessment of basic locomotor movements of elementary school students is Pre-experimental design research conducted to prove the provision of game treatment in learning activities of eight locomotor movements, namely walking, running, jumping, hopping, galloping, sliding, skipping, and leaping with are observation through motion observation instruments in the form of tests as puzzle games. The research was conducted on first-grade elementary school children aged 7-9 years with a total of 32 people.

This study will describe the achievement of 8 basic locomotor skills of students before the intervention and after the intervention was given. The form of game activities is given through activities that integrate more than one basic locomotor movements in one play activity. Therefore, with a minimum teaching time allocation, students are expected to be able to achieve maximum learning outcomes in accordance with the achievement of mastering various locomotor skills.

The intervention model of playing activities was carried out in two teaching meetings with 3 different game models in each meeting, where in each game there would be 4 different basic locomotor movements. Thus, the total model applied during the two meetings is 6 game models . The division of the model can be clarified as follows:

Table 1. Distribution of Basic Locomotor Movements in Games

Activity	Information
Model 1	*Basic Walking, Galloping, Sliding, Leaping*
Model 2	*Basic Sliding, Galloping, Jumping, Skipping*
Model 3	*Basic Jumping, Leaping, Sliding, Running*
Model 4	*Basic Hopping, Skipping, Running, Walking*
Model 5	*Basic Jumping, Hopping, Galloping, Running*
Model 6	*Basic Leaping, Skipping, Hopping, Walking*

The research instrument used a Puzzle Test [20] which utilized a playful approach to measure the 8 basic locomotor skills. The results of the pre-test and post-test will be analyzed and tested using the T-Test. The hypotheses for this study are as follows:

H0: there is no difference in basic locomotor movement skills between the results of the pre-test and post-test

Ha: there is a difference in basic locomotor movements between the results of the pre-test and post-test

The results of the t-test will give two possible decisions, namely:

If the value t-count > t-table $\alpha = 0.05$, then H0 is accepted and Ha is rejected

if the value of t-count < t-table $\alpha = 0.05$, then H0 is rejected and Ha is accepted

Results and Discussion

Before applying the t-test to see if there is a difference in the basic locomotor movement skills of the study before and after treatment, the pre-test and post-test data frequency distribution is firstly

presented. Subsequently, it will be continued with the pre-post test data normality test and finally the difference in treatment results will be seen through the t-test. The following is the data on the achievement of mastery of basic locomotor skills for 32 respondents based on 8 basic locomotor activities before the intervention was carried out.
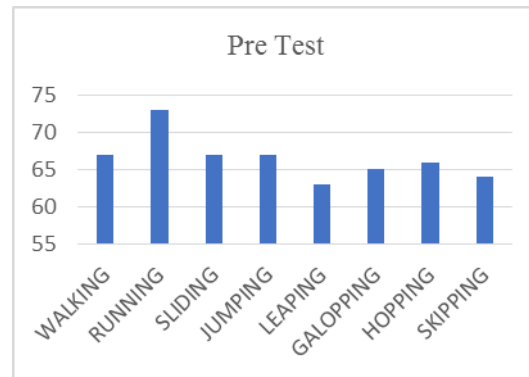

Figure 1. Bar Diagram 8 Locomotor Movement Skills

From the bar chart of basic locomotor movement skills in Figure 1, it can be said that 32 respondents in the study aged 7-9 years, the achievement of basic locomotor movement skills based on the activity of each component at the time of the preset is depicted as follows: the highest position is the ability to run with a score 73, walking, sliding, jumping all have a score 67, hopping a with score 66, galopping a with score of 65, skipping with score 64 while the lowest order is leaping with a score 63. While the table below will describe the spread of achievement of mastery of basic locomotor skills for the total score.

Table 2. Distribution of pre-test data

Interval Class	Frequency	Percentage (%)
9 – 12	4	28
13 – 16	12	37.5
17 – 20	11	34.37
21 – 24	5	15.63
	32	100

According to distribution results, the frequency of pre-test data in table 2 shows that the basic locomotor movement skills of elementary school students using the puzzle test instrument are illustrated that their skills before receiving treatment are 12 people (37.5%) in the average range class, 4 people (28%) below the average range class, and 16 people (50%) above the average range class.

Next is the data after the treatment given to 32 respondents with a the total of 2 teaching meeting times, and each meeting was given 3 model interventions. The following data is presented in the form of a bar chart for each basic locomotor movement skills.
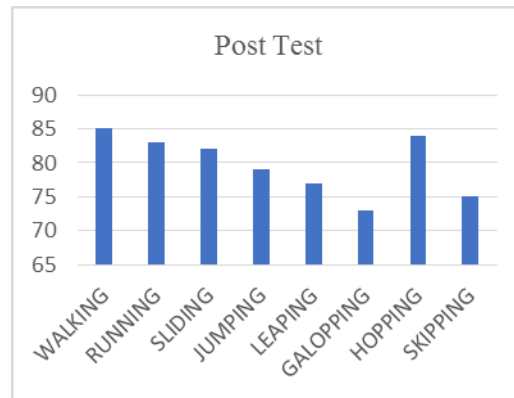
Figure 2. Bar Diagram 8 Locomotor Movement Skills

The bar chart of basic locomotor movement skills in Figure 2 illustrates that 32 respondents in the study aged 7-9 years, the achievement of basic locomotor movement skills based on the activity of each component after the intervention activity was given, it was seen that each movement component increased with the position of the score has changed. It can be seen that the score obtained is better than the pre-test results which are already above a score of 70. The highest position is walking ability with a score 85, hopping score 84, running score 83, sliding score 82, jumping score 79, leaping score 77, skipping score 74, galopping a score 73 while the lowest order is leaping with a score 63. The following table will describe the distribution of achievement of mastery of basic locomotor skills for the total number of basic locomotor skills.

Table 3. Distribution of data post-test

Interval Class	Frequency	Percentage (%)
17 – 22	31	96.88
23 – 28	1	3.12
29 – 34	0	0
	32	100

Based on the results of the frequency distribution of post-test data table 3, it was found that the basic locomotor skills of elementary school students using the puzzle test instrument were illustrated that their skills after receiving treatment were 31 people (96.88%) in the average range class and 1 person (3.12%) above the average range class. From the data on the distribution of eigth locomotor basic movement skills, both presented per activity and overall from the existing pre-test and post-test scores, the next step is to test for normality and t-test to prove whether the treatment given has an effect on the achievement of basic locomotor skills.

Table 4. Pre-test Normality Test

Min	Max	Mean	SD	L-count	L-table
9	24	16.6	3.92	0.0680	0.1542

According to table 4, the distribution of data in the class before treatment showed that the pre-test data was normally distributed L-count = 0.0680 < Ltable = 0.1542.

Table 5. Post-test Normality Test

Min	Max	Mean	SD	L-count	L-table
17	23	19.9	1.48	0.0806	0.1542

According to table 5, post-test data obtained L-count = 0.0806 < Ltable = 0.1542 meant that the data also normally distributed. Furthermore, ~~a~~ the t-test was conducted to determine the significant difference between the two data, namely the pre-post test. The results of the independent sample t-test showed the value of Sig. was 0.176. This informed that H0 is rejected and Ha is accepted. Thus, there was a significant difference in basic locomotor movement skills before being given treatment and after being given treatment.

The study began by determining the experimental group according to the existing characteristics, then a pre-test was carried out using a puzzle test instrument that measured 8 basic locomotor movement skills. Subject selection was based on the characteristics of first-grade elementary school students aged 7-9 years without distinguishing ~~between~~ genders [21].

The results of the pre-test were firstly tested for normality and the results were normally distributed with the number L-count = 0.068 < Ltab = 0.1542. Then the treatment process through learning activities after completion was given via a post-test using the same puzzle test instrument for the pre-test. The results obtained with the post-test were re-tested for normality to determine whether the data were normally distributed and the data results in the post-test were also normally distributed L-count = 0.0806 < Ltab = 0.1542. Normality test is important to determine the central tendency of the analysis to be carried out [22] [23] such as t-test and calculation of standard deviation [24]. The assumption of normality means that the collected data is normally distributed which then becomes important in parametric assumptions [25].

An independent sample t-test was conducted to determine significant differences in 8 basic locomotor skills. The results of the independent sample t-test showed that the significance value was 0.176, meant that the hypothesis H0 was rejected and Ha was accepted. There was a significant difference between the results of the pre-test and post-test. Based on the test results, it was assumed that the application of games could be integrated into physical education learning activities for elementary school students aged 7-9 years. This was in line with the results of previous studies that playing activities could improve basic movements or were limited to basic locomotor movements of elementary school students [17], [26].

Playing activities gives students flexibility in exploring motion in their learning activities. For this reason, physical education teachers need to take advantage of playing activities as an active and creative method because it can shape students' attitudes to like physical activity and ultimately form an active lifestyle attitude until adulthood. In line with this study [27], teachers who pay attention to various creative methods and means significantly influence students' attitudes towards the activities they do. Advanced learning is carried out with creative learning as an effort to evaluate activities and plan further activities.

Conclusion

According to the results of the study, it was concluded that by conducting fun games and various variations of movements during the study, it was seen that the intervention of basic locomotor movements learning model for elementary school students aged 7-9 years could improve their basic locomotor movement skills. This is the evidence from the results of the independent sample t-test showing the value of Sig. of 0.176. This informed that the hypothesis H0 was rejected and Ha was accepted. Thus, there was a significant difference between the results of the pre-test and post-test. For this reason, it is suggested that physical education teachers can provide various different activities by looking at the developmental aspects of elementary school-aged children who like playing activities. Physical education teachers are also able to evaluate the achievement of student learning outcomes through various appropriate observation and assessment formats. From the results obtained, it is expected that physical education teachers are able to make improvements by designing different activities to gain better student learning outcomes.

References

[1] HaitaoHAO, A. Sbeih, og F. H. A. Shibly, «Physical education and its role in improving the health of college students by active participation and optimization by deep learning», Aggress. Violent Behav., s. 101628, 2021.

[2] J. V. Nielsen, T. V. G. Bredahl, A. Bugge, H. Klakk, og T. Skovgaard, «Implementation of a successful long-term school based physical education intervention: Exploring provider and programme characteristics», Eval. Program Plann., bd. 76, s. 101674, 2019.

[3] J. M. Griffo, P. Hodges-Kulinna, R. H. J. Marttinen, og S. Battistella, «A systematic review of integrative practices in physical education (2009–2018)», Int. J. Educ. Res., bd. 104, s. 101689, 2020.

[4] E. F. N. Sari, R. R. Julianti, N. M. Siregar, og Sukiri, «Locomotor basic movement levels in improving the health of elementary school students», Int. J. Hum. Mov. Sport. Sci., bd. 8, nr. 6, s. 16–21, 2020.

[5] L. M. Barnett, J. A. Hnatiuk, N. D'Souza, J. Salmon, og K. D. Hesketh, «What Factors Help Young Children Develop Positive Perceptions of Their Motor Skills?», Int. J. Environ. Res. Public Health, bd. 18, nr. 2, s. 759, jan. 2021.

[6] S. L. C. Veldman, K. Q. Scott-Andrews, R. E. Hasson, N. Colabianchi, og L. E. Robinson, «Fundamental motor skill physical education lessons increase health-enhancing physical activity in elementary school-age children», Heal. Behav. Policy Rev., bd. 7, nr. 5, s. 481–488, 2020.

[7] D. Jones, A. Innerd, E. L. Giles, og L. B. Azevedo, «Association between fundamental motor skills and physical activity in the early years: A systematic review and meta-analysis», Journal of Sport and Health Science. mar-2020.

[8] E. F. N. Sari, Sujarwo, og S. Sukiri, «Basic Locomotor Movement of First Grade Students of Elementary School», 2019.

[9] S. Guijarro-Romero, D. Mayorga-Vega, C. Casado-Robles, og J. Viciana, «School physical education-based reinforced program through moderate-to-vigorous physical activity improves and maintains schoolchildren's cardiorespiratory fitness: A cluster-randomized controlled trial», Sci. Sports, 2021.

[10] A. Dania, V. Tyrovola, og M. Koutsouba, «Proposal for a new method for teaching fundamental motor skills», Procedia - Soc. Behav. Sci., bd. 2, nr. 2, s. 4949–4954, 2010.

[11] I. Rocamora, S. González-Víllora, J. Fernández-Río, og N. M. Arias-Palencia, «Physical activity levels, game performance and friendship goals using two different pedagogical models: Sport Education and Direct Instruction», Phys. Educ. Sport Pedagog., bd. 24, nr. 1, s. 87–102, 2019.

[12] A. Palmizal, D. Pujianto, Nurkadri, og A. A. N. P. Laksana, «Development of a creative gymnastics model to improve basic locomotor movements for students in elementary school», Int. J. Hum. Mov. Sport. Sci., bd. 8, nr. 6, s. 78–84, 2020.

[13] S. Behan, S. Belton, C. Peers, N. E. O'Connor, og J. Issartel, «Moving Well-Being Well: Investigating the maturation of fundamental movement skill proficiency across sex in Irish children aged five to twelve», J. Sports Sci., bd. 37, nr. 22, s. 2604–2612, nov. 2019.

[14] I. Asiimwe, J. F. Babalola, og S. Atuhaire, «Physical activities , resources , and challenges in the implementation of physical education program in public primary schools in Kampala , Uganda : A cross-sectional survey», nr. August, 2021.

[15] T.-K. S. Miang, Fundamental Movement Skills For Growing Active Learners. Singapore: Singapore Sport Council, 2010.

[16] M. Xu mfl., «Personalized training through Kinect-based games for physical education», J. Vis. Commun. Image Represent., bd. 62, s. 394–401, 2019.

[17] E. F. N. Sari, Sujarwo, og Sukiri, «The Improvement of Locomotor Basic Movement Through AniChrac Games», 2020.

[18] Yusmawati, Y. Yusmawati, og E. F. N. Sari, «The Implementation of Basic Locomotor Learning in Special Schools BT - 5th International Conference on Physical Education, Sport, and Health (ACPES 19)», 2019.

[19] V. Balan og M. Shaao, «Study on Improving the Specific Content of Teaching Physical Education Classes through Movement Games in Primary School», Procedia - Soc. Behav. Sci., bd. 117, s. 173–178, 2014.

[20] E. F. N. Sari, «Locomotor basic movement skill instruments through games for elementary school», J. Phys. Conf. Ser., bd. 1402, s. 077081, des. 2019.

[21] T. Vidranski, I. Vrbik, G. Sporiš, I. Arsić, og N. Stojiljković, «GENDER DIFFERENCES IN LEARNING MOTOR SKILLS FOLLOWING A VIDEO DEMONSTRATION IN PRIMARY SCHOOL CHILDREN», Phys. Educ. Sport, bd. 18, nr. 2, s. 283–293, 2020.

[22] P. Mishra, C. M. Pandey, U. Singh, A. Gupta, C. Sahu, og A. Keshri, «Descriptive statistics and normality tests for statistical data», Ann. Card. Anaesth., bd. 22, nr. 1, s. 67–72, 2019.

[23] D. Jelito og M. Pitera, «New fat-tail normality test based on conditional second moments with applications to finance», Stat. Pap., 2020.

[24] S. G. Kwak og S.-H. Park, «Normality Test in Clinical Research», J. Rheum. Dis.,bd. 26, nr. 1, s. 5, 2019.

[25] T. K. Kim og J. H. Park, «More about the basic assumptions of t-test: normality and sample size.», Korean J. Anesthesiol., bd. 72, nr. 4, s. 331–335, aug. 2019.

[26] V. A. Karisman, M. Asmawi, Samsudin, og F. Dlis, «Developing Model of Games to Improve Students' Fundamental Movement Skills», bd. 35, nr. Icssht 2019, s. 88–90, 2021.

[27] M. Stănescu, L. Vasile, og I. Safta, «Educational Approaches Designed to Improve Active Lifestyle in Teenagers», Procedia - Soc. Behav. Sci., bd. 117, s. 27–33, 2014.

[28] T. Dobrescu, M. Cretu, E. F. Grosu, og C. Culea, «Considerations Regarding the Creative Dimension of the Physical Education and Sports Didactic Process», Procedia - Soc. Behav. Sci., bd. 93, s. 853–858, 2013.

Copyrights