

Educational Game "Pusaran Ular Tangga" To Improve Fundamental Motor Skill (FMS) of Grade 3 Elementary School Students

Juego Educativo "Pusaran Ular Tangga" En la mejora de las habilidades motrices fundamentales (FMS) de los alumnos de tercer curso de primaria

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Abstract. The poor Fundamental Motor Skills (FMS) among children is an important concern in promoting physical activity. The combination of structured exercises and structured games is an effective measure to improve the Basic Motor Skills of school children. This study aims to determine the effect of educational game "Pusaran Ular Tangga" on FMS of 3rd grade students. This research method is an experimental method with Single-Group Pretest-Posttest Design. This research was conducted on grade 3 elementary school students in West Bandung Regency with a sample of 30 people using the total sampling technique. Measurement of Basic Motor Skills using practical tests measured by the Test Of Groos Motor Skill - (TGMD 2) instrument for ages 3-10 years. Based on the Wilcoxon test, it is known that the significance value of 0.000 is smaller than <0.05 , it can be concluded that the educational game "Pusaran Ular Tangga" has an effect on increasing the Fundamental Motor Skill of grade 3 elementary school students. The difference in the improvement of Fundamental Motor Skill between before and after treatment is 36%.

Keywords: Educational Games, Physical Activity, Fundamental Motor Skills, School Age Children

Resumen. La deficiencia de las Habilidades Motrices Fundamentales (HMB) entre los niños es una preocupación importante a la hora de promover la actividad física. La combinación de ejercicios estructurados y juegos estructurados es una medida eficaz para mejorar las Habilidades Motrices Fundamentales de los escolares. El objetivo de este estudio es determinar el efecto del juego educativo "Pusaran Ular Tangga" en las DPM de los alumnos de 3º de primaria. Este método de investigación es un método experimental con un diseño preprueba-postprueba de un solo grupo. Esta investigación se llevó a cabo en alumnos de 3er grado de primaria de la Regencia de Bandung Oeste con una muestra de 30 personas utilizando la técnica de muestreo total. Se midieron las habilidades motrices básicas mediante pruebas prácticas con el instrumento Test Of Groos Motor Skill - (TGMD 2) para edades comprendidas entre los 3 y los 10 años. Sobre la base de la prueba de Wilcoxon, se sabe que el valor de significación de 0,000 es menor que $<0,05$, se puede concluir que el juego educativo "Pusaran Ular Tangga" tiene un efecto en el aumento de la Habilidad Motora Fundamental de los alumnos de 3er grado de primaria. La diferencia en la mejora de la habilidad motriz fundamental entre antes y después del tratamiento es del 36%.

Palabras clave: Juegos educativos, Actividad física, Habilidades motrices fundamentales, Niños en edad escolar.

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Introduction

Indonesia has the fourth largest youth population in the world at 85 million or one-third of the total population (Unicef Indonesia, 2016). This is a concern for the government to maximize the potential of children to become quality children in the midst of technological advances which also have a negative impact on the development and growth of children, such as sedentary lifestyle behavior. This sedentary behavior is a problem experienced by children today, especially the millennial generation. (Fuadah et al., 2021).

Sedentary lifestyle behavior is a lifestyle where a person is not physically active or does not perform physical movements (Wikipedia, 2023). These behaviors require little energy expenditure such as watching television, playing video games, computers, sitting in class or on transportation (Yusfita, 2018; Park et al., 2020). In addition, a change in lifestyle and less physically demanding occupations (Katzmarzyk & Mason, 2009) such as screen-based activities are increasingly keeping children and adolescents from meeting recommended physical activity standards (World Health

Organization, 2018) so that it does not contribute enough and meaningful benefits to their health (Cavill, 2001). *Active Healthy Kids Global Alliance* (AHKGA) in collaboration with Sun Life, released the Youth Physical Activity Report Cards which assesses the level of physical activity of children and adolescents in a number of countries around the world, including Indonesia that the level of physical activity of adolescents in Indonesia received a score of F, which means that less than 20% of children aged 6-17 years reach an average of 60 minutes of physical activity per day (CNN Indonesia, 2022).

The decline in physical activity is a big concern for the Indonesian government. This decline in physical levels has contributed to the rise in global obesity rates which have increased substantially in the last 30 years (Young dkk., 2014). It has been studied that excess weight in schoolchildren is associated with alterations in fundamental movement patterns (Duncan et al., 2013). The results of previous studies show that there is a relationship between the quality of fundamental movement patterns and anthropometric variables (Lavados et al., 2021). This relationship indirectly leads

to a decrease in physical activity related to motivation and self-confidence. The discussion regarding fundamental movement patterns in this research is very important to overcome the problems regarding children's physical activity that have been explained above.

Fundamental Motor Skill

The importance of the benefits of physical activity among young people is indisputable as physical activity is associated with short- and long-term health status. This is supported by research that shows a positive association between being physically active at a young age and an active lifestyle in adulthood (Lopes et al., 2021; Barnett et al., 2016; Stodden et al., 2008; Entier et al., 2013). In order to be physically active, the development of Fundamental motor skills is necessary (Tompsett et al., 2017). FMS is a key asset in performing physical activities and is the earliest foundation for teaching more complex motor skills from sports and diverse physical activities (Newell, 2020). FMS movements are the basic movements for learning and developing lifelong physical activity (Bakhtiar, 2015). Basic movement skills provide unique movement patterns and skills that are developed primarily in childhood and adolescence as 'core developmental activities' (Lisa M Barnett et al., 2016). The development of these basic movements will be optimized if children are given opportunities for practice, encouragement, and instruction in the learning process. This FMS includes three categories of movement namely: Stability Movement such as balancing and turning; locomotor such as running and jumping; and object control such as catching and throwing (Goodway et al., 2019; Gallahue, D. L. and Donnelly, 2003) (Lisa M Barnett et al., 2016). FMS is very important for children to have as a basis for more complex movement dexterity so that these movements occur on the basis of autonomously controlled reflex movements in each required movement (Kurniawan, 2021). Failure to develop basic motor skills during preschool and elementary school will frustrate children and fail to develop more complex movements during adolescence and adulthood so that it will hinder the achievement of good physical activity in the future. Therefore, the school through this physical learning program is expected to be able to optimize the development of basic motor skills as a whole, especially in lower grade students, physical education learning is focused on the development of students' Fundamental Motor Skills (Setiawan et al., 2020).

The process of developing basic motor skills can be done by transforming the role of the teacher through various methodological strategies, such as guided discovery, project-based work, problem solving, environmental exploration or play strategies (Yáñez-sepúlveda et al., 2023). All of the above methodological strategies are learning that provides meaningful life experiences for students (Yáñez-sepúlveda et al., 2023). One of the basic motor skills programs for chil-

dren through play is an alternative offered as an approach to learning movement skills. Play is a relevant way for children to learn about the body and movement skills. Play also serves as a facilitator to develop cognitive, affective and psychomotor aspects, particularly fine and gross motor development (Akbari et al., 2009). Play is an important strategy that allows children to have fun and freedom of expression, while still providing learning content that is appropriate for their developmental stage (Luarte R. et al., 2014).

One of the previous studies regarding the educational game "Snakes and Ladders" was able to improve basic jumping movements in 4th grade elementary school students (Dwijayanti et al., 2023). In this research, the educational game that will be used is "Pusaran Ular Tangga". This media-based learning game "Pusaran Ular Tangga" is a game of "snakes and ladders" like in general, but the difference lies in the path of the journey which is circular from the outside to the inside. This game is a form of adaptation to the characteristics of students who like to play. Apart from that, the modification of movement tasks combined in this game is the main factor in improving basic movement skills such as locomotor movements, stability movements and manipulative movements. Based on the description above, the aim of this research is to find out whether the educational game "Pusaran Ular Tangga" has an effect on improving the basic movements of 3rd grade elementary school students.

Subjects and metode

Setting and participants

The research was conducted at State Elementary School 2 Cipeundeuy Padalarang aged 9-10 years. The sample used was grade 3 elementary school students with a sample size of 30 people. The sample determination was determined through nonprobability sampling technique, namely comprehensive sampling, this is because there is only one class 3 in the school. The research method used in this research is experimental method with Single-Group Pretest-Posttest Design. All samples were given a pre-test before being given educational games 'Pusaran Ular Tangga', then a post test was conducted to see the results of the program.

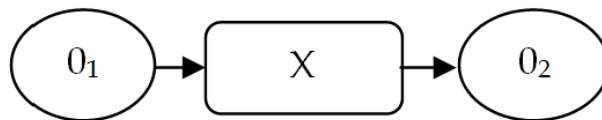


Figure 1. Research design

Ket.

- O₁ : Pretest
- X : Treatment
- O₂ : Posttest

Instruments

Instruments and techniques for collecting Fundamental Motor Skill data using tests and measurements in the form of

Fundamental Motor Skill practice tests, namely the Test Of Groos Motor Skill - (TGMD 2) for ages 3-10 years. TGMD 2 is a test to measure basic movement skills. This test consists of locomotor movements including: run, gallop, leap, hop, horizontal jump, and slide; and object control movements: throw, catch, kick, strike, dribble, underhand roll for children aged 3 to 10 years (Ulrich, 2000). The Test of Groos Motor Skill was administered one week before and after the educational game program “Pusaran Ular Tangga”.5).

Procedure

To find out the level of students' basic movements, a pre-test was carried out first by measuring the basic locomotor and manipulative movement skills of students before the educational game program ‘Pusaran Ular Tangga ’ was given to students. Then proceed with conducting a posttest to see the improvement after being given the Pusaran Ular Tangga ’ game program. This program is conducted for four weeks with each session lasting 50 minutes and held twice a week. The movement task material is grouped into three parts, namely locomotor motion, stability motion, and manipulative motion. Each movement task is carried out per week for two meetings. As a whole, the learning process is grouped into three parts: 1) general warm-up, 2) educational game 'Pusaran Ular Tangga', and 3) cooling down. Educational games ‘Pusaran Ular Tangga’ like the snakes and ladders game that uses dice, but in the game ‘Pusaran Ular Tangga’ The path of travel is circular from outside to inside with the finish point in the center of the field. The game board is

divided into small squares that contain motion tasks in each square. Some boxes have numbers and pictures of 'stairs', 'snakes' and 'positive word pictures' connecting them to other boxes. Each number in the small box is given a movement task that the child must perform. While the ladder picture instructs the player to jump to the next box, the 'snake' picture instructs the player to go back to the previous box and the 'positive word picture without' the movement task. Each group is given a certain symbol / object that represents the group in the game box.

This game is played in groups of 5 or more people, where each representative will be given a turn to roll the dice and move their group's objects/symbols into the game box according to the number of dice that come out. If the group stops on a number box then the group will carry out a predetermined movement task and if it stops on a 'positive word' picture then the task is not given. The movement task will be monitored by the teacher directly, while the other groups continue the game by rolling the dice again so that it will be time efficient.

Motion tasks are arranged based on locomotor motion, stability motion and manipulative motion according to the learning objectives of each meeting as in table 1. Motion tasks have been compiled based on the researcher based on the form and function of the movement. as for the adaptation of the room to the motion pattern is carried out in the open or school yard (small or medium field) with the location of the area determined by the teacher according to the movement task so that each group will go directly to the place of implementation of the predetermined motion task.

Table 1. The Task of Motion in Educational Games ‘Pusaran Ular Tangga’

Week	Classification of Movement	Task of Motion	Task of Code
1	Pretest & Locomotor Movement	1. Perform a 10-meter brisk walk	1. Arrogant
		2. Tiptoe walk 10 meters	2. Violating
		3. Gallop run 10 meters	3. Cheating
		4. Moving a small ball	4. Selfish
		5. Do a 10-meter side run (Slide)	5. Lazy
		6. Gallop run 5 meters	6. Lying
2	Locomotor Movement	1. Perform a zig-zag run	1. Arrogant
		2. Performing a frog jump	2. Violating
		3. Performing a jump with 2 legs	3. Cheating
		4. Performing a jump with 1 leg	4. Selfish
		5. Running over the ball	5. Lazy
		6. Performing a frog jump	6. Lying
3	Stability movement	1. Perform arm rotations 15 times	1. Arrogant
		2. Doing neck twists 15 times	2. Violating
		3. Performing waist twisting 15 times	3. Cheating
		4. Flying boat stance 20 seconds	4. Selfish
		5. T stance 20 seconds	5. Lazy
		6. Doing neck twists 20 times	6. Lying
4	Stability movement	1. Combination of arm rotation and knee bend 10 times	1. Arrogant
		2. Single leg rest 20 seconds	2. Violating
		3. Kissing the knee 10 seconds	3. Cheating
		4. Circular jumps in place 10 times	4. Selfish
		5. Combination of leg bend and upright jump 10 times	5. Lazy
		6. Single leg rest 15 seconds	6. Lying
5	Manipulative Movement	1. Combine bouncing and throwing a basketball 5 times.	1. Arrogant

		2.	Dribble the basketball for 10 meters	2.	Violating
		3.	Volleying the ball with 2 hands to a certain area 5 times	3.	Cheating
		4.	Volleying the ball with 1 hand to a specific area 5 times	4.	Selfish
		5.	Passing the basketball in pairs 20 times.	5.	Lazy
		6.	Dribble the basketball for 10 meters	6.	Lying
6	Manipulative Movement	1.	Controlling the soccer ball with the foot 20 times		
		2.	Kick the ball to a target 8 meters away	1.	Arrogant
		3.	Throwing and catching the ball while moving in pairs 202. times	2.	Violating
		4.	Hitting the ball with a stick with a passive object 5 times	3.	Cheating
		5.	Rolling the ball to a specific target 6 meters away 10.	4.	Selfish
		6.	Kick the ball to a target 8 meters away	5.	Lazy
				6.	Lying
7	Locomotor, stability, dan Manipulative Movement	1.	Combined motion task		
8	Post test				

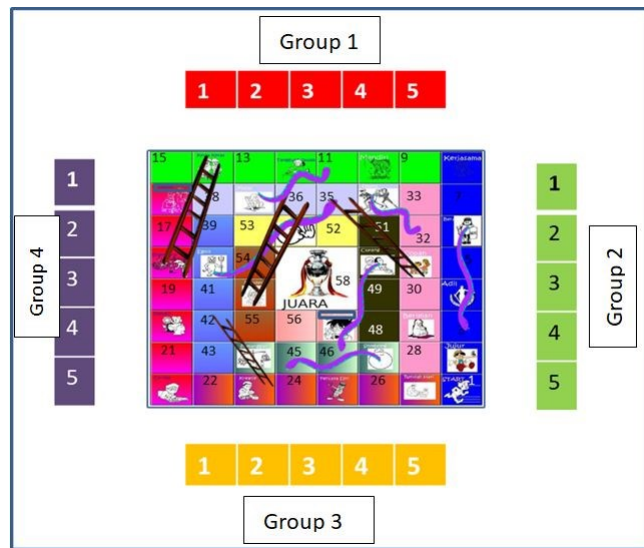


Figura 2. The Game "Pusaran Ular Tangga"

Statistical Analysis

After the data is collected, the next step is to analyze the data. The data analysis technique to analyze experimental data with the pretest posttest design model is to use the Wilcoxon test.

Results and Discussion

Results

The results of data collection of Fundamental Motor Skill measurements in the form of locomotor and manipulative movement skills in grade 3 elementary school students obtained the following results :

Table 2.

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Pretest	30	4	9	5.67	.221	1.213
Posttest	30	8	12	9.97	.242	1.326
Valid N (listwise)	30					

Based on table 2, the value of Fundamental Motor Skill

before being given the game program is 4 minimum and 9 maximum. While the value of movement skills after being given the game program is worth 8 minimum and 12 maximum. The comparison of the average value before and after being given the game program is 5.67 and 9.97..

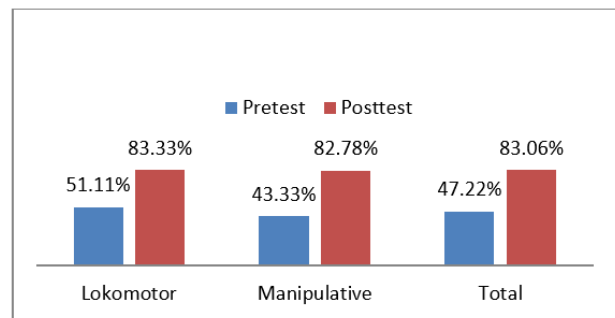


Figure 3. Comparison of Percentage of Mastering Basic Movements

Based on table 3, the percentage of locomotor Fundamental Motor Skills before and after the program is 51.11% and 83.333%. While the percentage of Fundamental Motor Skill manipulative before and after the program is 43.33% and 82.78%. The overall amount was 47.22% before the treatment and 83.06% afterwards. If averaged, the difference in the increase in Fundamental Motor Skill between before and after treatment is 36%.

Table 3.

Frequency Distribution of Fundamental Motor Skill Level

Interval Class Category		Pretest		Posttest	
		Absolute Frequency	Relative Frequency	Frequency	Relative Frequency
0 - 5.31	Low	14	47	0	0
5.32 - 10.32	Medium	16	53	19	63
10.32 - 12	High	0	0	11	37
Total		30	100	30	100

Based on table 4 on frequency distribution, the results of students' Fundamental Motor Skills before treatment show a category of "low" as much as 47%, "medium" as much as 53%, and "high" none. While the results of students' Fundamental Motor Skills after treatment show a low category of "none", "medium" as much as 19%, and "high" as much

as 53%. The data shows that the overall level of students' Fundamental Motor Skills has increased. The following is graph 1 about the comparison between the frequency distribution of Fundamental Motor Skills before and after treatment.

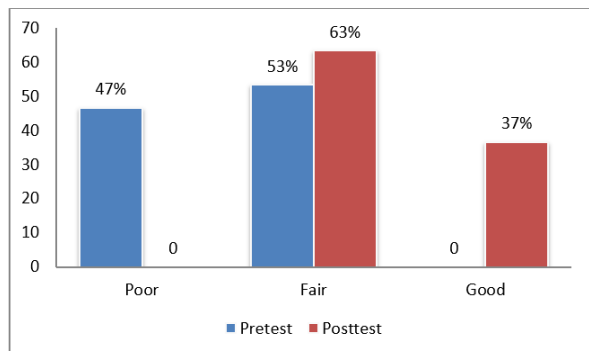


Figure 4. Frequency Distribution of Fundamental Motor Skill

The results will be analyzed further using the Wilcoxon test in table 5. using SPSS calculations with the test conditions, the hypothesis is accepted if the significance value is <0.05 and the hypothesis is rejected if the significance value is >0.05. Based on table 4, it is known that the significance value of 0.000 is smaller than <0.05, it can be concluded that "Hypothesis accepted". This means that the educational game 'Whirlpool of Snakes and Ladders' has an effect on improving students' Fundamental Motor Skills.

Table 4.

Uji Wilcoxon	
Test Statistics ^a	
	Posttest - Pretest
Z	-4.829 ^b
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Discussion

Based on the results of the above research, the educational game "Whirlpool of Snakes and Ladders" has an effect on improving children's Basic Motor Skills. This is evidenced by the Wilcoxon statistical test which shows a significance number below 0.05. In addition, the frequency distribution data of children's overall mastery of Fundamental Motor Skills shows that the level of Fundamental Motor Skills of children as a whole has increased after being given the educational game program "Virgin Snakes and Ladders". The increase in basic movement skills before and after being given the program is around 36% or reaches a value of 83% of the total sample.

The results of this study are also supported by several previous studies which show that the educational game "snakes and ladders" can improve basic jumping movements in 4th grade elementary school students (Dwijayanti et al.,

2023). In other "snakes and ladders" games, the educational game "labyrinth" also has an effect on improving the fine motor skills of children aged 4-5 years and "dam-dam carpet" is able to improve the basic movements of jumping in class. 2 elementary school students (Wibawa, 2022). The equivalence of the three previous studies is that they are both educational games that all combine elements of play with specific movement tasks that are believed to be able to improve basic movement skills. The difference between the Educational Game "Whirlpool of Snakes and Ladders" and other games lies in the type of motion tasks provided. In this game, the research provides a variety of movement tasks

Further study of the types of basic movement skills, viz: locomotor and manipulative movements are also important to discuss. The data shows that the comparison between the percentage increase in locomotor motion after being given the program increased by 32.22%. While manipulative motion increased by 39.45% after being given the program. The data shows that the percentage increase in manipulative motion is greater than locomotor motion. This difference can be caused by the quality of the movement tasks performed by children and their interest in doing so. The quality of the movement tasks given may be poorly understood or done in a random manner so that it does not have an impact on improving basic movements. In addition, the student's interest factor can also cause differences in results in performing the given motion tasks. Interest here refers to manipulative movement tasks that tend to be preferred by children rather than locomotor movements. Manipulative movements using tools such as basketball and volleyball are more interesting for students so they do it with full attention and pleasure.

Based on a meta-analysis review effective FMS interventions should collaborate between intentional play (unstructured activity) and structured exercise (Riethmuller et al., 2010). Deliberate play aims to improve motor flexibility and intrinsically motivates to be physically active thus maximizing enjoyment (Koolwijk et al., 2023). As for structured exercises that aim to provide feedback, time for problem solving, evaluation, and repetition of performance to improve behavior (Anders Ericsson, 2008). The combination of deliberate practice and deliberate play has a positive impact at a young age (Baker & Côté, 2006). Varying portions of exercise with a focus on deliberate and playful play should be a larger part of interventions than structured training. Therefore, a teacher's knowledge of content knowledge (CK) and pedagogical content knowledge (PCK) should be good so that the design between practice and play is balanced. This is supported by research literature which shows that teachers who demonstrate high levels of CK and PCK will achieve better FMS outcomes for their students (Cohen et al., 2012).

A study on the use of educational games through play

media in learning showed that the group given the game had a greater level of satisfaction than the other groups (Crianças et al., 2018). For children, learning will be effective if done in a fun atmosphere (Nugrahani & Rupa, 2017). Even A Convenção sobre os Direitos da Criança (CDC) states that children's right to participate in games and recreational activities is adjusted to the child's identity (Lourenço et al., 2023). Based on observations made by researchers, students' enthusiasm when using this learning media makes students interested and excited.

Conclusion

The conclusion of this study shows that the educational game "Pusaran Ular Tangga" as an unstructured activity combined with structured exercises (movement tasks to improve basic movement skills) is a learning alternative that can be applied by teachers in improving children's basic movement skills. In addition, teachers' knowledge of content knowledge (CK) and pedagogical content knowledge (PCK) is also the basis for effective learning planning.

References

- Akbari, H., Abdoli, B., Shafizadeh, M., Khalaji, H., Hajihosseini, S., & Ziaee, V. (2009). The effect of traditional games in fundamental motor skill development in 7-9 year old boys. *Iranian Journal of Pediatrics*, *19*(2), 123–129.
- Anders Ericsson, K. (2008). Deliberate practice and acquisition of expert performance: A general overview. *Academic Emergency Medicine*, *15*(11), 988–994. <https://doi.org/https://doi.org/10.1111/j.1553-2712.2008.00227.x>
- Baker, J., & Côté, J. (2006). Shifting training requirements during athlete development: Deliberate practice, deliberate play and other sport involvement in the acquisition of sport expertise. *Essential Processes for Attaining Peak Performance*, *1*, 92–109.
- Bakhtiar, S. (2015). *Merancang Pembelajaran Gerak Dasar Anak*. UNP Press. <http://repository.unp.ac.id/65/>
- Barnett, L. M., Salmon, J., & Hesketh, K. D. (2016). More active pre-school children have better motor competence at school starting age: An observational cohort study. *BMC Public Health*, *16*(1), 1–8. <https://doi.org/https://doi.org/10.1186/s12889-016-3742-1>
- Barnett, Lisa M, Stodden, D., Miller, A. D., Cohen, K. E., Smith, J. J., Dudley, D., Lander, N. J., Lenoir, M., Brown, H., Iivonen, S., & Morgan, P. J. (2016). Fundamental Movement Skills: An Important Focus Only Leads to a Limited Number. *Journal of Teaching in Physical Education*, *35*, 219–225.
- Cavill, N. A. (2001). Health Enhancing Physical Activity for Young People : Statement of the United Kingdom Expert Consensus Conference. *Pediatric Exercise Science*, *13*. <https://doi.org/10.1123/pes.13.1.12>
- CNN Indoneisa. (2022). *Dapat nilai F, Cuma Kurang dari 20 persen remaja RI Yang Doyan Gerak*. <https://www.cnnindonesia.com/gaya-hidup/20221123195931-255-877843/dapat-nilai-f-cuma-kurang-dari-20-persen-remaja-ri-yang-doyan-gerak>
- Cohen, R., Goodway, J. D., & Lidor, R. (2012). The effectiveness of aligned developmental feedback on the overhand throw in third-grade students. *Physical Education and Sport Pedagogy*, *17*(5), 525–541. <https://doi.org/doi:10.1080/17408989.2011.623230>
- Crianças, A. D. E., Ciclo, N. O., & Ensino, D. O. (2018). Coimbra, 2018. *Amaral, ECarmem Lúcia Dos Santos, I.*
- Dwijayanti, K., Firdaus, M., & Yusuf, M. (2023). Aplikasi Media Permainan Ular Tangga untuk Meningkatkan Gerak Dasar Lompat pada Siswa SD. *Jurnal Pendidikan Kesehatan Rekreasi*, *9*(2), 225–235.
- Entier, I., D'Hondt, E., Shultz, S., Deforche, B., Augustijn, M., Hoorne, S., & Lenoir, M. (2013). Fine and gross motor skills differ between healthy-weight and obese children. *Research in Developmental Disabilities*, *34*(11), 4043–4051. <https://doi.org/https://doi.org/10.1016/j.ridd.2013.08.040>
- Fuadah, D. Z., Siswoaribowo, A., & Daniaty, E. (2021). Sedentary Lifestyle with Social Interaction in Adolescent. *Journal of Applied Nursing and Health*, *3*(2), 77–83.
- Gallahue, D. L. and Donnelly, F. C. (2003). *Developmental physical education for all children*, *Revista de investigación clínica; organo del Hospital de Enfermedades de la Nutrición*.
- Goodway, J. D., Ozmun, J. C., & Gallahue, D. L. (2019). *Understanding motor development: Infants, children, adolescents, adults* (7th ed).
- Katzmarzyk, P. T., & Mason, C. (2009). The Physical Activity Transition. *Journal of Physical Activity and Health*, *6*(February 2020). <https://doi.org/10.1123/jpah.6.3.269>
- Koolwijk, P., Hoeboer, J., Mombarg, R., Savelsbergh, & Vries, S. de. (2023). Fundamental movement skill interventions in young children: a systematic review. *International Journal of Sport and Exercise Psychology*. <https://doi.org/https://doi.org/10.1080/1612197X.2023.2210597>
- Kurniawan, D. . (2021). *PENGARUH LEVEL PHYSICAL ACTIVITY ANAK TERHADAP FUNDAMENTAL MOVEMENT SKILLS: SYSTEMATIC LITERATURE REVIEW*. http://repository.upi.edu/60820/2/T_POR_1707333_Chapter1.pdf
- Lavados, F. M., Naiman, V. P., Concha, C. P., Uarac, M. M., Correa, S., & Gajardo-burgos, R. (2021).

- Asociación entre variables antropométricas y calidad de movimientos fundamentales en una muestra de escolares chilenos entre 12 y 14 años Association between anthropometric variables and quality of fundamental movements in a sample of Chilean schoolchildr. *Retos*, 2041, 359–364.
- Lopes, L., Santos, R., Coelho-e-Silva, M., Draper, C., Mota, J., Jidovtseff, B., & Duncan, M. (2021). A narrative review of motor competence in children and adolescents: What we know and what we need to find out. *International Journal of Environmental Research and Public Health*, 18(1). <https://doi.org/https://doi.org/10.3390/ijerph1801018>
- Lourenço, A., Pereira, B., Mendes, R., & Martins, F. (2023). 2023, Retos, 50, 817-825 ©. *Retos*, 2041(50), 817–825.
- Luarte R., C., Poblete V., F., & Flores R., C. (2014). Nivel de desarrollo motor grueso en preescolares sin intervención de profesores de educación física. *Concepción, Chile. Ciencias De La Actividad Física UCM*, 15(1). <http://revistacaf.ucm.cl/article/view/36>
- Newell, K. M. (2020). What are Fundamental Motor Skills and What is Fundamental About Them? *Journal of Motor Learning and Development*, 8(2001), 280–314.
- Nugrahani, R., & Rupa, J. . (2017). Media Pembelajaran Berbasis Visual Berbentuk Permainan Ullar Tangga Untuk Meningkatkan Kualitas Belajar Mengajar Di Sekolah Dasar. *Lembaran Ilmu Kependidikan*, 36(1), 35–44.
- Park, J. H., Moon, J. H., Kim, H. J., Kong, M. H., & Oh, Y. H. (2020). Sedentary Lifestyle : Overview of Updated Evidence of Potential Health Risks. *Korean Journal of Family Medicine*, 41, 365–373.
- Riethmuller, A., Jones, R., & Okely, A. (2010). Efficacy of interventions to improve motor development in young children: A systematic review of controlled trials. *Journal of Science and Medicine in Sport*, 12. <https://doi.org/https://doi.org/10.1016/j.jsams.2009.10.170>
- Setiawan, A., Yudiana, Y., Ugelta, S., Oktriani, S., Budi, D. R., & Listiandi, A. D. (2020). Hasil belajar pendidikan jasmani dan olahraga siswa sekolah dasar: pengaruh keterampilan motorik (tinggi) dan model pembelajaran (kooperatif). *TEGAR: Journal of Teaching Physical Education in Elementary School*, 3(2), 59–65.
- Stodden, D. F., Goodway, J. D., Langendorfer, S. J. Robertson, M. A., Rudisill, M. E., Garcia, C., & Garcia, L. E. (2008). A developmental perspective on the role of motor skill competence in physical activity: An emergent relationship. *Quest (Grand Rapids, Mich)*, 60(2), 290–306. <https://doi.org/https://doi.org/10.1080/00336297.2008.10483582>
- Tompsett, C., Sanders, R., Taylor, C., & Cobley, S. (2017). Pedagogical approaches to and effects of fundamental movement skill interventions on health outcomes: A systematic review. *Sports Medicine*, 47(9), 1795–1819. <https://doi.org/https://doi.org/10.1007/s40279-017-0697-z>
- Unicef Indonesia. (2016). *Anak-anak di Indonesia*. Unicep.Org. <https://www.unicef.org/indonesia/id/anak-anak-di-indonesia>
- Wibawa, C. S. (2022). Wellness and healthy magazine. *WELLNESS AND HEALTHY MAGAZINE*, 4(2), 317–328. <https://doi.org/10.30604/well.256422022>
- Wikipedia. (2023). *Sedentary lifestyle*. https://en.wikipedia.org/wiki/Sedentary_lifestyle
- World Health Organization. (2018). *Physical activity*. <https://www.who.int/news-room/fact-sheets/detail/physical-activity>
- Yáñez-sepúlveda, R., Gudenschwager-sauca, K., Añasco-rodríguez, P., Trigo-alvarez, J., Muñoz-rojas, C., Olivares-arancibia, J., Hurtado-almonacid, J., & Cortés-roco, G. (2023). Efectos de los juegos didácticos en la clase de Educación Física en el logro de aprendizaje trasversal sobre hábitos de higiene escolar en estudiantes de 6 y 7 años. *Retos*, 49, 237–244.
- Young, M. D., Plotnikoff, R. C., Collins, C. E., Callister, R., & Morgan, P. J. (2014). Social cognitive theory and physical activity : a systematic review and meta-analysis. *Behavior/Etiology*, 13, 1–13. <https://doi.org/10.1111/obr.12225>
- Yusfita, L. Y. (2018). HUBUNGAN PERILAKU SEDENTARI DENGAN SINDROM METABOLIK PADA PEKERJA. *The Indonesian Journal of Public Health, January*, 143–155. <https://doi.org/10.20473/ijph.v1i3il.2018.143-155>

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