

Flash Card Learning Media in Physical Education Improves Students' Locomotor Movement Skills Los medios de aprendizaje con fichas en educación física mejoran la capacidad locomotora de los alumnos

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Abstract. Students' learning of locomotor movement skills sometimes has obstacles that become a challenge for Physical Education (PE) teachers. This research aims to find out how flash card learning media influences students' locomotor skills. This study involved 46 grade 3 students in elementary schools and aged 9-10 years. This research applies a pre-experimental method with a one group pretest posttest design. Test of Gross Motor Development – 2 (TGMD-2) is used as a research instrument to measure the development of students' locomotor skills. The TGMD-2 instrument used only focuses on locomotor movement tests. This research shows that flash card learning media has a significant influence on students' locomotor skills. The results of the pretest and posttest differences show a p-value of 0.00 ($\text{sig} < 0.05$) for the 4 test variables tested, Run, Gallop, Hop and Horizontal Jump. Meanwhile, the other 2 variables, Leap and Slide, show a p-value of 0.53 ($\text{sig} < 0.05$) and 0.22 ($\text{sig} < 0.05$), which means there is no difference or no increase. On the other hand, data percentage calculations present for the variable slide showed a slight increase of 4.58%. Meanwhile, for the leap variable, there is no percentage increase at all or 0.00%. The highest percentage increase was found in the gallop variable with a percentage of 37.95%. Flash card learning media has been proven to have a significant influence on students' locomotor skills. This learning media can also be used to vary the game-based PE learning model.

Keywords: elementary school, fundamental movement skills, tgmd-2, motor learning

Resumen. El aprendizaje de las destrezas locomotoras por parte de los alumnos presenta a veces obstáculos que se convierten en un reto para los profesores de Educación Física (EF). Esta investigación pretende averiguar cómo influyen los medios de aprendizaje de tarjetas flash en las habilidades locomotoras de los alumnos. En este estudio participaron 46 alumnos de tercer curso de primaria con edades comprendidas entre los 9 y los 10 años. Esta investigación aplica un método preexperimental con un diseño pretest posttest de un grupo. El Test de Desarrollo Motriz Grueso-2 (TGMD-2) se utiliza como instrumento de investigación para medir el desarrollo de las habilidades locomotoras de los alumnos. El instrumento TGMD-2 utilizado sólo se centra en pruebas de movimiento locomotor. Esta investigación muestra que los medios de aprendizaje con tarjetas flash tienen una influencia significativa en las habilidades locomotoras de los alumnos. Los resultados de las diferencias entre el pretest y el posttest muestran un valor p de 0,00 ($\text{sig} < 0,05$) para las 4 variables de prueba analizadas, Carrera, Galope, Salto y Salto horizontal. Mientras tanto, las otras 2 variables, Salto y Deslizamiento, muestran un p-valor de 0,53 ($\text{sig} < 0,05$) y 0,22 ($\text{sig} < 0,05$), lo que significa que no hay diferencia o no hay aumento. Por otra parte, los cálculos porcentuales de datos presentes para la variable deslizamiento mostraron un ligero aumento del 4,58%. Mientras tanto, para la variable salto, no hay ningún aumento porcentual o 0,00%. El mayor aumento porcentual se encontró en la variable galope con un porcentaje del 37,95%. Se ha demostrado que los medios de aprendizaje con fichas tienen una influencia significativa en las habilidades locomotoras de los alumnos. Este medio de aprendizaje también puede utilizarse para variar el modelo de aprendizaje de la educación física basado en juegos.

Palabras clave: educación física, habilidades fundamentales del movimiento, tgmd-2, aprendizaje motor

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Introduction

Observing a child's development is a fascinating process. It involves monitoring two crucial aspects, cognitive and psychomotor skills (Patiño, Nieto, Martínez, Riaño, & Dimas, 2023). The cognitive aspect is an aspect of a child's development that is related to intellectual intelligence or in terms of knowledge (Park, 2014). The psychomotor aspect is an aspect of child development that is related to a child's movement ability or motor skills (Costa, Abelairas-Gomez, Arufe-Giráldez, Pazos-Couto, & Barcala-Furelos, 2015). Motor skills in a child's development include locomotor movements, non-locomotor movements and manipulative movements (Ivashchenko, 2020).

Locomotor movements are body movements carried out by a person to move places (Palmer, Miller, Meehan, & Robinson, 2020). These locomotor movements include walking, running, jumping and skipping. In locomotor movements, jumping and jumping movements are carried

out horizontally, both forwards and backwards. Then for non-locomotor movements, these are movements carried out by a person at the same point, or it could be said to make movements without changing places (Sunanto, Asmara, Himawan, & Purwoto, 2022). These non-locomotor movements include squatting, standing, swinging your arms, jumping or jumping vertically, and many more. Next is manipulative movements, which are movements of a person's body that are carried out using means or media to do so, for example throwing and kicking (Chen, Mason, Hammond-Bennett, & Zalmout, 2016).

Physical Education (PE) is a process of learning movement or motor skills in a child or student including locomotor, non-locomotor and manipulative movements (Durdan-Myers & Bartle, 2023). PE trains cognitive and affective aspects of students (Jones, Karageorghis, Lane, & Bishop, 2017). The cognitive aspect occurs when in the learning process, there is an element of strategy (Gilbert et al., 2023). Strategy in PE, trains students' thinking processes to

achieve their goals when competing in PE learning (Ávalos-Ramos & Ruiz, 2020). Competition in PE is fostered through play, including big ball games, small ball games, and sports games, which are also known as traditional games (Ribas et al., 2023). The process of playing in PE indirectly trains the affective aspects of students, through sportsmanship, cooperation, honesty, and so on (Güneş & Yılmaz, 2019). Therefore, PE is a type of learning that is able to train three important aspects (cognitive, affective, psychomotor) in students.

The learning process requires media or facilities that are used to support the learning process (Kurniawan, Nugroho, Hidayat, Hidayat, & Rohmansyah, 2022). So, the knowledge transfer process that occurs between teachers and students can be carried out well. PE learning can be done by creating learning media that can attract students' attention to move (Handayani et al., 2023). Learning media in PE are very diverse, some use modification tools, images, videos and other media (Ridwan et al., 2023). One learning media that is unique and interesting and can be applied in PE learning is by using flash card learning media.

Flash card learning media is a medium that is presented in the form of images and writing via a card (Muhith, Wulan Agustina, Bahtiar, & Afidah, 2020). These cards will be used as task cards that will be carried out by students (Andriyadi & Irawan, 2018). Students will carry out movements or instructions according to the pictures and writing on the cards (Nahar & Taroreh, 2020). In addition to psychomotor learning, flash cards can also be used for cognitive learning (Alwi & Aulia, 2023), such as reading (Wulan & Rahma, 2020), memorisation (Ying et al., 2021), and critical thinking (Erma et al., 2019). According to (Wahyuni, 2020) on p. 2, flash card learning media has advantages or advantages that can be felt by teachers and students when carrying out the learning process. The first is practical and easy to carry anywhere, the second is easy to remember or understand, the third is interesting and fun.

Physical Education (PE) at elementary school level aims to develop or improve a child's basic movement skills (Fuji Santoso, Santoso, Arianto, & Nurdin, 2023). Learning locomotor skills in PE cannot be done directly to a student. The learning process is carried out in stages starting from knowing, understanding and practicing (Massri, Armijos, & Rocha, 2022). The introduction stage begins when students know or see the movement. The understanding stage is when the movements they see begin to be digested by the brain to be carried out again by the student. The practicing stage occurs when children already know and understand the movements they have seen. When these three stages are collaborated, a movement will be created that is in accordance with what they know and understand.

The motor learning theory developed by Paul Fitts and Michael Posner, explains that when a student learns motor skills, he or she will go through three phases of learning (Schmidt & Lee, 2019). The first is the cognitive phase, meaning that in this phase there is a visual and verbal transfer of knowledge. This process stimulates students to think

of a movement based on what is received by their senses. As a result of this thinking process, a rudimentary movement will be created. Furthermore, to perfect the movement, it occurs in the association or fixation phase. In this phase, students will learn to make the correct movements according to the direction of the physical education teacher. When students already know the correct movement, repetition movements will be made until the student becomes skilled. Then, the movements that have been done skilfully will become automatic or become reflex movements. Students are able to perform the movement without rethinking the correct movement. This phase is called the automation phase, the peak phase or the final phase in learning motion according to Paul Fitts and Michael Posner.

Based on that theory, the use of flash cards in this study will maximise the learning process through the phases in the theory. In this research, we will discuss the role of flash card media in learning locomotor skills. The problems found by researchers are at the elementary school level in Surabaya, precisely at SDN Wiyung 1/453. The problem is that students have difficulty in understanding and practising locomotor movements explained by PE teachers. This difficulty is caused by the lack of appropriate learning media used by physical education teachers. PE teachers only provide visualisation through narration, so students have difficulty in understanding the explanation. Based on this, researchers try to provide solutions with an interesting and innovative media. The role of innovative and attractive learning media is needed to stimulate students in learning locomotor skills (Taufik, Ridlo, Solahuddin, Iskandar, & Taroreh, 2022). Learning media is useful for providing a clearer picture or visualization to students (Harris et al., 2023). Researchers formulated a hypothesis that the use of flash card learning media can have an influence on students' locomotor skills in elementary schools.

Materials and Methods

Participants

This research was conducted involving third grade students at SDN Wiyung 1/453 in Surabaya. The sampling technique used was purposive sampling. The sample studied was based on the value of students' locomotor movement skills which were considered insufficient by the PE teacher at the school. The sample studied in this research was 46 students, with the number of male students being 22 students. Meanwhile, the number of female student samples was 24 students. The sample has an age range of 9-10 years.

Study Design

A pre-experimental method with a one group pretest posttest design was used in this research. This method only requires one sample group that will receive treatment or experimentation. The resulting output is in the form of pretest scores and posttest scores. These output will be analyzed to determine the differences and improvements that

occur as a result of treatment or experimentation. However, this method has a disadvantage in that there is no comparison group for the experimental group. This method only measures the pretest posttest scores of the same group without being compared to another group (control group).

Instrument

Table 1.
Locomotor Test Instrument of TGMD-2

No	Subtest	Tools and Materials	Instructions
1	Run	60 feet of space, and also 2 cones.	Place 2 cones 50 feet apart. Make sure there is a safe area to stop at the second cone with a distance of 8-10 feet. Instruct students to sprint from one cone to another by saying "Go". Repeat on the second try.
2	Gallop	25 feet of wiggle room, tape, and 2 cones.	Mark a distance of 25 feet at each end with cones or tape. Instruct students to gallop from one cone to another. Repeat the second attempt by returning to the first cone.
3	Hops	Minimum movement space of 15 feet.	Instruct students to do 3 hops using the dominant leg and do 3 more hops with the non-dominant leg.
4	Leap	20 feet of space, beanbags, and tape.	Place the beanbag on the floor or track. Place the tape on the floor 10 feet apart in a straight line with the beanbag. Instruct students to stand on the tape. Then, run and do a leap through the beanbag. Repeat on the second try.
5	Horizontal Jump	A minimum of 10 feet of movement and tape.	Mark the starting line using tape. Give instructions to students to do a horizontal jump from behind the line. Then, jump as far as possible with both feet. Repeat on the second try.
6	Slide	Minimum 25 feet of movement space, rope, 2 cones.	Place the cones on the prepared lines, with a distance of 25 feet between cones. Instruct students to slide from one cone to another. Repeat on the second try.

Procedure

Flash card learning media was used as a medium for providing treatment to the samples (Figure 1). This media is in the form of picture cards which contain movement tasks that must be carried out by students. The movement tasks given are adapted through animal movements which are visualized in the form of pictures. The media used is suitable for PE learning materials, specifically for locomotor skills and games. In the treatment given, the PE teacher will shuffle the cards and they will be taken randomly by the students. Intake is done by selecting students randomly. Card collection is also done by holding a competition between students to take the card.



Figure 1. Learning Media Flash Card (Indonesia Language)

Statistical Analysis

The research employs SPSS Statistics 25 as the software for data analysis. Normality tests and descriptive statistical tests are carried out using Kolmogorov Smirnov. Normal data is indicated by a significance value or p-value of more than 0.05 ($\text{sig} > 0.05$). Non-normal data is indicated by a

The Test of Gross Motor Development – 2 (TGMD-2) was used as a research instrument in evaluating this research intervention (Ulrich, 2000). However, researchers only used test instruments to evaluate locomotor movements. The application of TGMD-2 in the evaluation of locomotor movements can be observed as follows (Table 1).

p-value of less than 0.05 ($\text{sig} < 0.05$).

The difference test was carried out using the T test (T-Test). The T test for similar samples is to use the Paired Sample T Test for normal data, and for abnormal data using Wilcoxon. A significant difference is indicated by a p-value < 0.05 , whereas if the p-value is > 0.05 then there is no significant difference. In the Wilcoxon test, it will be known that there is a decrease (negative), an increase (positive), and there is no decrease or increase (ties) in the variables studied. Apart from that, the resulting p-value shows that this variable has a difference or an increase from pretest to posttest.

Calculating the percentage of data is needed to find out how much influence the flash card learning media has on students' locomotor skills. This calculation is carried out using a formula from the mean of the SPSS analysis results from the pretest and posttest of the variables tested. The formula for calculating experimental results is as follows.

$$\text{Persentase Data} = \frac{\text{mean posttest} - \text{mean pretest}}{\text{mean pretest}} \times 100\%$$

Result

The results of the normality test indicate that out of the 12 variables tested, only one variable, namely the Hop pretest, follows a normal distribution (Table 2). This is indicated by a p-value of 0.11 ($\text{sig} > 0.05$) for the Hop pretest variable. Meanwhile, the other 11 test variables showed a non-normal distribution with a p-value below 0.05 ($\text{sig} > 0.05$).

Table 2.

Normality Test						
Variables	N	Mean	SD	Min.	Max.	p-value
Pretest Run	46	14.57	2.51	8.00	16.00	0.00
Pretest Gallop	46	10.54	2.84	8.00	16.00	0.00
Pretest Hop	46	14.96	3.46	10.00	20.00	0.11*
Pretest Leap	46	10.39	2.29	6.00	12.00	0.00
Pretest Horizontal Jump	46	12.48	2.58	8.00	16.00	0.01
Pretest Slide	46	13.76	2.74	8.00	16.00	0.00
Posttest Run	46	15.96	0.29	14.00	16.00	0.00
Posttest Gallop	46	14.54	2.44	8.00	16.00	0.00
Posttest Hop	46	18.46	2.12	10.00	20.00	0.00
Posttest Leap	46	10.39	1.39	6.00	12.00	0.00
Posttest Horizontal Jump	46	14.26	1.96	9.00	16.00	0.00
Posttest Slide	46	14.39	2.08	9.00	16.00	0.00

* Sig > 0.05

Paired sample difference tests were carried out using the Wilcoxon test. The Wilcoxon test was carried out because the data in this study were not normally distributed, only 1 test variable had a normal distribution (Table 3). The Wilcoxon test results show that there are 4 test variables that have differences between the pretest and posttest, or have increased. This increase is shown by the variables run, gallop, hop and horizontal jump with a p-value of 0.00 (sig < 0.05). Meanwhile, the other 2 test variables had no difference between pretest and posttest, or experienced a decrease. This is indicated by a p-value of 0.53 (sig < 0.05) for the leap variable, and a p-value of 0.22 (sig < 0.05) for the slide variable.

Table 3.

Wilcoxon Test			
Variables	Ranks	N	p-value
Run	Negative	1	0.00*
	Positive	15	
	Ties	30	
	Total	46	
Gallop	Negative	3	0.00*
	Positive	34	
	Ties	9	
	Total	46	
Hop	Negative	3	0.00*
	Positive	33	
	Ties	10	
	Total	46	
Leap	Negative	24	0.53
	Positive	14	
	Ties	8	
	Total	46	
Horizontal Jump	Negative	6	0.00*
	Positive	30	
	Ties	10	
	Total	46	
Slide	Negative	12	0.22
	Positive	21	
	Ties	13	
	Total	46	

* Sig < 0.05

The results of data percentage calculations show that the gallop variable experienced the highest increase compared to other variables with an increase percentage of 37.95%. The increase was not too high in the slide variable with a percentage level of only 4.58%. For the leap variable, there is no increase with a percentage of 0% (Table 4).

Table 4.

Data Percentage Calculation				
Variable	N	Mean Pretest	Mean Posttest	Percentage (%)
Run	46	14.57	15.96	9.54
Gallop	46	10.54	14.54	37.95
Hop	46	14.96	18.46	23.40
Leap	46	10.39	10.39	0.00
Horizontal Jump	46	12.48	14.26	14.26
Slide	46	13.76	14.39	4.58

Discussion

The process of developing students' locomotor skills does not always run well and smoothly (Yu et al., 2016). This research was motivated by problems in the process of developing students' locomotor movement skills. The results of observations made by researchers, there are a group of students who show confused behaviour and do not understand the explanations given by PE teachers. PE teachers only explain conventionally, so the learning process is less effective and interesting. In addition, this condition also causes students' learning motivation to decrease, and has an impact on the understanding received to be less comprehensive. The learning media used by PE teachers functions to stimulate students to more easily understand the material provided by the teacher (Hussein, Abdul-Wahid, & Hamzeh, 2019). Structured PE learning using interesting media will have an impact on improving and developing students' locomotor skills (Abusleme-Allimant et al., 2023). Increasing and developing locomotor skills will also affect students' health and fitness (Carson et al., 2017). Besides that (Wang, Chen, Liu, Sun, & Gao, 2020), on p. 11., stated that the development of students' locomotor skills occurs more often when they play with their peers.

This research, with a one group pretest posttest design, aims to determine the effect of flash card learning media on students' locomotor skills. Based on the research results, almost all locomotor skills test variables experienced a significant increase. A significant increase occurred in the gallop and hop variables, each with a positive rank of 34 and 33, and an increase percentage of 37.95% and 23.40%.

The decrease occurred in the leap and slide variables, with the respective number of samples that did not experience an increase being 32 and 25 samples. In the leap variable, the ratio between samples that experienced an increase and those that did not was 14:32. Meanwhile, the slide variable has a ratio of 21:25. Based on this, the leap variable has a p-value of 0.53 (sig > 0.05) and the slide variable has a p-value of 0.22 (sig > 0.05). This means that there is no difference and there is no improvement.

In calculating data percentages, the slide variables show different results with different tests. The data percentage was calculated and the slide variable experienced a slight increase of 4.58%. This is inversely proportional to the results of the different tests carried out and the norms for these tests. Meanwhile, for the leap variable, it is directly proportional to the different test results with an increase percentage of 0.00%. Research and development research by (Nahar & Taroreh, 2020), flash card learning media has

proven to be effective as a PE learning media with an effectiveness level of 90.6%. Research by (Made Agus Wijaya & Kanca, 2019), movement activity cards are effectively applied in PE learning at elementary and middle school levels with a positive response of 96.70% after following the learning process. Quasi-experiment research by (M. A. Wijaya, Astra, Artanayasa, & Paramitha, 2019), shows that the fundamental skills card learning media is effective in improving elementary school students' basic movement skills using cooperative learning methods.

Learning basic movement skills for elementary school students requires media that can attract students' attention in learning movement skills (Monsalve & Sanchez, 2019). This media can be packaged in various forms and variations according to the creativity of the PE teacher (Greve, Diekhoff, & Süßenbach, 2022). Learning media using images is considered to attract students' attention in following the learning process well (Hamdhan Utama, Cholid, Studi Pedidikan Jasmani, & Pascasarjana, 2021).

The use of image media is able to stimulate students to better understand the material provided by the teacher (Erma, Koeswanti, & Giarti, 2019). The audio-visual process experienced by students will stimulate students' thinking processes (Blumberg & Brooks, 2017). The brainstorming process occurs when students begin to understand and digest the information provided (Beemer et al., 2023). Then, it will be realized in the form of movement patterns created from the thought process (Brame, 2016; H'mida et al., 2020). The movement learning process will experience continuous improvement until the student experiences movement automation. Movement automation that occurs in students will be a positive thing where the movement learning process develops well (Indahwati, 2023). Research by (Iserbyt, Madou, Vergauwen, & Behets, 2011; Rekik et al., 2021), suggests using movement task card-based learning media in PE learning. Learning media based on movement task cards is also effective in providing understanding to students with special needs (Forbes & Yun, 2023).

This research has several limitations experienced by researchers when conducting research. First, the flash card learning media used in this research has limitations in the design applied. Using paper media with added lamination on the front and back does not guarantee that the media will still be used well in the continuous learning process. Second, this research only examines locomotor movements in elementary school students. Third, the research period was relatively brief, consisting of only four meetings over the course of four weeks.

Conclusion

The use of flash card learning media in the physical education classroom improves the students' motor skills. This is proven by a significant increase in test variables in the difference test results and data percentage calculations. The increase occurred in the run, gallop, hop, and horizontal jump test variables. While the leap and slide test variables

did not experience a significant increase. The highest increase occurred in the gallop test variable, while in the leap test variable there was no increase at all. Based on these results, the application of flash card media has a significant effect on the locomotor movement skills of elementary school students. The application of flash card media can provide very significant results if the application process is carried out over a long period of time. Thus, the stimulus provided through the flash card media can be channeled optimally. The researcher suggests that for further research, the limitations experienced in this research can be used as consideration in developing research related to the development of students' basic movement skills in elementary schools.

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