Available online at: http://journal.unj.ac.id/unj/index.php/gjik
Gladi: Jurnal Ilmu Keolahragaan 15 (03) 2024, 363-375
Permalink/DOI: https://doi.org/10.21009/GJIK.153.10

THE EFFECT OF LEARNING STRATEGIES AND MOTOR EDUCABILITY ON THE OUTCOMES OF LEARNING BASIC MANIPULATIVE MOVEMENT OF ELEMENTARY SCHOOL STUDENTS

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(Submission Track: Received: 07-08-2024, Final Revision: 29-09-2024, Available Online: 30-09-2024)

Abstracts This study aims to determine the effect of the difference between using the Teaching Games for Understanding (TGFU) learning strategy and differentiation learning strategies and motor educability on the learning outcomes of manipulative basic movements in students. The subjects in this study were fourth-grade students of the Integrated Islamic Elementary School (SDIT) Global Insan Madani, Jatirangga, Jatisampurna, Bekasi City, West Java. This study used treatment by level 2 x 2. This study was conducted on 65 selected students. The data analysis technique used was the two-way variance analysis technique (Two-Way Anova) and continued with the Tukey test with a significance level of $\alpha = 0.05$. The results of this study were (1). The learning outcomes of basic manipulative movements using the Teaching Games for Understanding (TGFU) learning strategy (A1) are higher than those using the differentiation learning strategy (A2); (2). There is an interaction between the learning strategy used (A) and motor educability (B) on the learning outcomes of students' basic manipulative movements; (3). The learning outcomes of basic manipulative movements using the Teaching Games for Understanding (TGFU) learning strategy with high motor educability (A1B1) are higher than using the differentiation learning strategy with high motor educability (A2B1) in grade IV students of SDIT Global Insan Madani; (4). The learning outcomes of basic manipulative movements using the Teaching Games for Understanding (TGFU) learning strategy with low motor educability (A1B2) are higher than using the differentiation learning strategy with low motor educability (A2B2) in grade IV students of SDIT Global Insan Madani.

Keywords: TGFU differentiation learning strategies; motor educability; learning outcomes of basic manipulative movements

INTRODUCTION

The subject called PJOK is related to the growth of abilities related to the development of skills in critical thinking, reasoning, emotional behavior, morals, stability, physical fitness, social skills, and motor skills (Jayul & Irwanto, 2020). According to (Priyambudi et al., 2023) the purpose of physical education is to teach students how to improve physical fitness, motor skills, knowledge, and behavior to improve healthy and active living, as well as athletic and emotional intelligence. Physical Education, Sports, and Health (PJOK) teaches students how to be physically healthy, have movement skills, think critically, solve problems in groups, reason, maintain emotional stability, live a moral life, and introduce a clean environment through physical, athletic, and health activities that are carefully selected and organized methodically to meet national education goals.

This is in line with the objectives of the Physical Education subject for Elementary School education level, namely to have physically literate individuals, one of which is having the ability to master basic movement patterns (fundamental movement patterns) and various good motor skills. (George Graham, 2021). Furthermore, according to Syaputra et al. (2023), there are three basic motor skills that students must be able to master in elementary school physical education classes, namely locomotor, non-locomotor, and manipulative. If students can do these three basic actions easily, then learning has been carried out. Moving from one place to another is called locomotor movement, while non-locomotor movement is called the opposite and involves manipulative movement. Objects are needed as a medium in manipulative movement to facilitate manipulative movement.

Basic manipulative movements are one type of fundamental movement activity that utilizes objects and body parts. Coordination of the use of tools such as balls, rackets, sticks, ropes, and so on is needed to perform manipulative movements (Kurniawan et al., 2022). Students' mastery of manipulating movements is essential because it can improve students' basic movements (Nurunnabilah et al., 2022). Manipulative abilities, also known as object control abilities (such as throwing, hitting, and catching balls) (Maïano et al., 2019). Thus the TGFU

model helps students who are less skilled in playing team games to improve their skills, performance, and understanding of game tactics and increase confidence and involvement in PJOK learning (Maïano et al., 2019).

The description above clarifies how important manipulative movements are in the physical education learning process, especially in sports where players must have superior physical skills. Students often make mistakes in performing manipulative movements for various reasons, including not understanding the steps or sequences when they want to move with an object. The importance of developing basic movement skill competencies among children has been attempted and emphasized by experts, researchers, and policymakers around the world which is outlined through the physical education curriculum in elementary schools (U.S. Department HHS, 2018). In Indonesia, based on the results of studies and research, reveal the fact that the mastery of basic movement skills in early childhood is relatively low and the competencies they have are still minimal and do not match their age level (Hasan et al., 2013; Oktarifaldi et al., 2019). Meanwhile, the basic motor skills possessed by children at elementary school age (locomotor and manipulative) should be approaching perfect to perfect levels (Goodway et al., 2012: Oktarifaldi et al., 2024).

Researchers also examined whether learning strategies and motor educability were related to basic manipulative movements in elementary schools. There are several relevant studies related to differentiated learning strategies for PJOK subjects (Rahman, et.al 2023). These results indicate that student learning outcomes can be improved through the application of differentiated learning strategies. This is due to applying appropriate learning strategies in the learning process.

To facilitate researchers in taking the steps taken in this study, using Factorial Design. Factorial design is a research approach that compares two or more independent variables to understand the influence of independent and their interactions on the dependent variable. Factorial design can be used to understand the interaction between variables. This study uses a 2 × 2 factorial design. Factorial design according to Sugiyono (2010), is a design that takes into account the potential of moderator variables to

influence treatment (independent variables) on outcomes (dependent variables). This design consists of two factors that are worked on simultaneously and involve many factors (free active modification and characteristics).

In this experimental research, three variables were involved (1). namely: the independent variable is the learning strategy consisting of the TGFU (Teaching Games for Understanding) learning strategy and the differentiated learning strategy (2). The dependent variable is the learning outcome of basic manipulative movements and (3). The attribute variable is motor educability from the high motor educability concept level and low motor educability.

Tabel 1. Treatment By Level 2 x 2 design

Learning Strategies (A) / ***Motor Educability* (B)**	**TGFU (A_1)**		**Differentiate (A_2)**
High motor educability (B_1)	A_1B_1	>	A_2B_1
Low motor educability (B_2)	A_1B_2	<	A_2B_2
Total	A_1	>	A_2

Keterangan :

A1B1 = Group of students who have high motor educability taught with the concept of TGFU (Teaching Games for Understanding) learning strategy.

A2B1 = Group of students who have high motor educability taught with the concept of differentiated learning strategy.

A1B2 = Group of students who have low motor educability taught with the concept of TGFU (Teaching Games for Understanding) learning strategy.

A2B2 = Group of students who have low motor educability taught with the concept of differentiated learning strategy.

A1 = TGFU (Teaching Games for Understanding) learning strategy.

A2 = differentiated learning strategy

METHODS

This research was conducted at the Global Insan Madani Integrated Islamic Elementary School (SDIT), Jatirangga Village, Jatisampurna District, Bekasi City in April–July of the 2023/2024 Academic Year.

The researcher used a direct random sampling procedure conducted from a population of 81 students by drawing lots. Several students, or a total of 65 people, were selected, and their motor ability levels were then measured

to determine who had high and low motor educability abilities. Furthermore, by using a percentage of 27% as the upper limit indicating a high value, and 27% as the lower limit indicating a low value, the number of each sample was 18 students for the high motor educability group and 18 students for the low motor educability group.

The introduction of basic manipulative movements into the class as a whole was carried out in the first week's meeting activities. The manipulative movements used in the game include throwing, catching, and kicking the ball. After that, a presentation was given in class on how to throw, catch, and kick the ball. After that, the implementation is carried out outside the classroom or in the field during weekly discussions facilitated by the teacher. The treatment given face-to-face is divided into four phases: (1) warm-up (introduction), (2) core learning, and (3) closing (cooling). The analysis technique used in this study is two-way variance (ANOVA) to test data at a significance level of $\alpha = 0.05$, using a treatment design based on the 2 x 2 level. To meet the data analysis criteria, the sample normality test uses the Shapiro-Wilk Test and the homogeneity test used is the Levene Test on the residue. In addition, if there is an interaction (as a result of the ANOVA calculation), the Tukey test is used to ensure the level of influence of the existing variables.

RESULTS AND DISCUSSION

The final test data was collected based on the results of basic manipulative movement learning which showed the impact of the learning process. The following is a summary of the data from the research calculations on self-confidence in basic manipulative movement learning.

Table 2. Summary of data from the research calculations.

Strategi Pembelajaran / **Motor Educability**	**TGFU (A_1)**	**Differentiate (A_2)**
High	$\sum X$ = 500 $\sum X^2$ = 13968 $\overline{X}$ = 27,78 SD = 2,157 N = 18	$\sum X$ = 443 $\sum X^2$ = 10906,75 $\overline{X}$ = 24,61 SD = 2,200 N = 18
Low	$\sum X$ = 371	$\sum X$ = 276

	$\sum X^2$ = 7699 $\overline{X}$ = 20,61 SD = 1,754 N = 18	$\sum X^2$ = 4267,25 $\overline{X}$ = 15,33 SD = 1,749 N = 18
Total	$\sum X$ = 871 $\sum X^2$ = 21667 $\overline{X}$ = 24,19 SD = 4,118 N = 36	$\sum X$ = 719 $\sum X^2$ = 15174 $\overline{X}$ = 19,97 SD = 5,096 N = 36

Information about the results of basic manipulative movement acquisition by the TGFU (Teaching Games for Understanding) learning strategy group. The results show that the range obtained is 17 to 32, with an average of 24.19, a standard deviation of 4.118, a median (Me) of 24, and a mode (Mo) of 19. So that it gives the results that there are 6 students or 16.7% receiving a score of 17–19, 9 students or 25% receiving a score of 20–22, 5 students or 13.9% receiving a score of 23–25, 10 students or 27.8% receiving a score of 26–28, 5 students or 13.9% receiving a score of 29–31, and 1 student or 2.8% receiving a score of 32–34.

Then the results with the differentiation learning approach group. The range obtained was 16 to 34. The average was 23.83 with a standard deviation of 4.463, the mode (Mo) was 26, and the median (Me) was 22.50. The results obtained were that there were 2 students or 5.6% who scored 11–13, 11 students or 30.6% who scored 14–16, 6 students or 16.7% who scored 17-19, 11 students or 30.6% who scored 23–25, and 6 students or 16.7% who scored 26–28.

High motor educability group data, using the TGFU (Teaching Games for Understanding) learning strategy to learn basic manipulative movements, with a range of values between 25 and 32, an average of 27.78 and a standard deviation of 2.157. While the Mode (Mo) is 26 and the median (Me) is 27.50. The resulting data shows that there are 2 students or 11.1% receiving a score of 24–25, 7 students or 38.9% receiving a score of 26–27, 5 students or 27.8% receiving a score of 28–29, 3 students or 16.7% receiving a score of 30-31, and 1 student or 5.6% receiving a score of 32–33.

Then the data of the low motor educability group in learning basic

manipulative movements using the Teaching Games for Understanding (TGFU) learning strategy showed a range of 17 to 23, an average of 20.61, and a standard deviation of 1.754; the median (Me) was 20.50, and the mode (Mo) was 19. The results obtained were 1 student or 5.6% scored 17, followed by 5 students, or 27.8% who scored 19, 3 students, or 16.7% scored 20, 2 students, or 11.1% scored 21, 4 students, or 22.2% who scored 22, and 3 students or 16.7% who scored 23.

The results of the group with high motor educability in basic manipulative movements using differentiation learning techniques. The range obtained was from 23 to 34, with a mean of 27.61 and a standard deviation of 2.747. The median (Me) and mode (Mo) were 26.50 and 26, respectively. The results obtained were that 1 student or 5.6% received a score of 19–20, followed by 8 students, or 44.4% who received a score of 23–24, 4 students, or 22.2% who received a score of 25–26, and 5 students or 27.8% who received a score of 27-28.

Learning outcome data for the low motor educability group in basic manipulative movements with differentiation learning strategies ranged from 16 to 22, with an average of 20.06 a standard deviation of 1.798, a median (Me) of 20, and a mode (Mo) of 22. The resulting data were 4 students or 22.2% receiving a score of 20, 3 students, or 16.7% receiving a score of 21, 5 students, or 27.8% receiving a score of 22, 1 student, or 5.6% receiving a score of 16, 1 student or 5.6% receiving a score of 17, and 3 students or 16.7% receiving a score of 18.

Hypothesis testing using analysis of variance (ANOVA) using the Two-Way ANOVA test using SPSS (Statistical Package for the Social Sciences) software was carried out on the condition that the data was normal and homogeneous. In this study, the homogeneity test of population variance was performed using the Tukey test at a significance of = 0.05, and the data normality test was performed using the Shapiro-Wilk test.

Table 3. Results of the normality test of residual data.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.

Standardized Residual for Hasil	.096	72	.100	.978	72	.232

a. Lilliefors Significance Correction

The results of the overall normality test of the research data group show that the sig. results in the Shapiro Wilk table > 0.05. So it can be stated that all samples are normally distributed.

Table 4. The results of the homogeneity test using the Levene test, α = 0.05

Levene's Test of Equality of Error Variances[a,b]

Levene Statistic	df1	df2	Sig.
.792	3	68	.502

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Nilai

b. Design: Intercept + A + B + A * B

Description:

A: Learning Strategy

B: Motor Educability Group

Based on the results obtained at a significance value of 0.502> 0.05. It can be stated that H0 is accepted, meaning that the variance is homogeneous.

Table 5. results of the Anova variance analysis using SPSS (Statistical Package for the Social Sciences) software at the α level = 0.05.

Tests of Between-Subjects Effects

Dependent Variable: Nilai

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
A	320.889	1	320.889	82.135	000
B	1216.889	1	1216.889	311.475	000
A * B	20.056	1	20.056	5.133	027

a. R Squared = ,854 (Adjusted R Squared = ,848)

Description:

A: Learning Strategy

B: Motor Educability Group

Based on the results of the Statistical Package for the Social Sciences (SPSS) analysis on the Tests of Between-Subjects Effects, it produces a significant value for the TGFU (Teaching Games for Understanding) learning strategy and differentiation learning strategy on the learning outcomes of basic manipulative movements of 0.000 <0.05. This means that there is a difference between the

learning strategies used on the learning outcomes of basic manipulative movements. This can also be seen in the Fh value of 82.135 which is compared to the Ftable value of 3.974. So that Fcount> Ftable, then H is rejected. Thus, it can be said that the application of the differentiation learning method to the TGFU (Teaching Games for Understanding) learning strategy has a real influence on the learning outcomes of basic manipulative movements. In other words, the learning outcomes of basic manipulative movements through the differentiation learning method (($\bar{X}$) = 19.97 and s = 5.096) are lower than the learning outcomes of basic manipulative movements through the Teaching Games for Understanding (TGFU) learning strategy (($\bar{X}$) = 24.19 and s = 4.118). This shows that the initial research hypothesis that proposed a difference in the impact of the differentiation learning approach with the TGFU (Teaching Games for Understanding) learning strategy on the learning outcomes of basic manipulative movements has been verified.

Regarding the learning outcomes of basic manipulative movements. The analysis of SPSS (Statistical Package for the Social Sciences) analysis produced an Fcount (FAB) value of 5.133, with an Ftable of 3.974. This shows that Fcount> Ftable, so it can be concluded that there is an interaction between the differentiation learning strategy and the TGFU (Teaching Games for Understanding) learning strategy with mobile educability on the learning outcomes of basic manipulative movements. In addition to the F value, it can also be seen from the sig. A*B value which is 0.027 <0.05. So there is an interaction between the differentiation learning strategy and the TGFU (Teaching Games for Understanding) learning strategy with mobile educability on the learning outcomes of basic manipulative movements, and H0 is rejected.

To compare the high learning motivation groups of the two teaching styles, the results of the advanced stage of variance analysis using the Tukey test refer to the Gane V perspective. Using the SPSS (Statistical Package for the Social Sciences) program, the results of the Tukey test analysis are displayed in the table below:

Table 6. Results of the Tukey Test Analysis (Tukey HSD).

Multiple Comparisons
Dependent Variable: Nilai

Tukey HSD

(I) Tukey	(J) Tukey	Mean Difference (I-J)	Sig.
TGFU Tinggi	TGFU Rendah	7.17*	.000
	Diferensiasi Tinggi	3.17*	000
	Diferensiasi Rendah	12.44*	000
TGFU Rendah	TGFU Tinggi	-7.17*	000
	Diferensiasi Tinggi	-4.00*	000
	Diferensiasi Rendah	5.28*	000
Diferensiasi Tinggi	TGFU Tinggi	-3.17*	000
	TGFU Rendah	4.00*	000
	Diferensiasi Rendah	9.28*	000
Diferensiasi Rendah	TGFU Tinggi	-12.44*	000
	TGFU Rendah	-5.28*	000
	Diferensiasi Tinggi	-9.28*	000

Based on observed means.
The error term is Mean Square (Error) = 3.907.
*. The mean difference is significant at the ,05 level.

Table 6 shows that the learning outcomes of the high motor educability group for basic manipulative movements when taught with the TGFU (Teaching Games for Understanding) learning strategy are different from those taught with the differentiation learning strategy. This means that the average difference price for the TGFU (Teaching Games for Understanding) learning strategy with high motor educability is greater than the differentiation learning strategy with high motor educability.

This shows that testing has been carried out on the third research hypothesis, which states that: For students with high motor educability, there is a difference in the learning outcomes of basic manipulative movements between the differentiation learning strategy and the TGFU (Teaching Games for Understanding) learning strategy.

The mean difference value in the TGFU (Teaching Games for Understanding) learning strategy is higher than the mean difference value of the differentiation learning strategy in the low motor educability group. Thus proving that there is a difference in the use of learning strategies for basic manipulative movements with the influence of the TGFU (Teaching Games for Understanding) learning strategy being better than the differentiation learning strategy.

Thus the TGFU model helps students who are less skilled in playing

team games to improve their skills, performance, and understanding of game tactics and increase confidence and involvement in PJOK learning (Papagiannopoulos, Digelidis, & Syrmpas, 2023).

CONCLUSION

Based on the research conducted, it resulted that the learning outcomes of basic manipulative movements were influenced by the use of learning strategies and students' motor educability. At high and low motor educability levels, the learning outcomes of basic manipulative movements of students in the application of the TGFU (Teaching Games for Understanding) learning strategy had a greater influence compared to the differentiation learning strategy. So the use of the TGFU (Teaching Games for Understanding) learning strategy is more efficient for students in elementary schools.

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