CGFU-PM 515 based physical education learning model to improve forward roll skills in elementary school students in Sleman Regency

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Abstract
This study aims to examine the physical education learning model based on CGFU PM-515 on improving forward roll skills in elementary school students in Sleman Regency. The method used is quasi-experimental with a one-group pretest-posttest design. The research subjects were 117 students from four elementary schools, namely SD Negeri Condongcatur, SD Muhammadiyah Condongcatur, SD Negeri Deresan, and SD Negeri Percobaan 2. Data collection techniques were carried out through skill tests, knowledge tests, and attitude questionnaires. Data analysis began with normality and homogeneity tests, followed by the Wilcoxon Signed Ranks Test due to non-normally distributed data and partially non-homogeneous data. The results showed a significant difference between pretest and posttest scores in the variables of skills, knowledge, and attitude with a significance value of $0.000 < 0.05$. These results prove that the implementation of the CGFU PM-515-based physical education learning model has a significant impact on improving forward roll skills in elementary school students. Thus, the CGFU PM-515 learning model can be used as an effective and innovative alternative learning model for physical education in elementary schools.

Keywords: physical education; CGFU PM-515; forward roll; elementary school.

INTRODUCTION

Elementary school is a very important level of education in preparing quality human resources. The quality of national education must start with improving the quality at elementary schools, as students are equipped with basic abilities and skills both academically and physically to prepare for the next level of education (Tolchah, 2018). Children aged 6-12 are in a transitional period from early childhood to pre-puberty, which involves rapid physical development, improved health, as well as cognitive, emotional, and social growth (Kurniawan et al., 2024). Regarding the development of students at the children's level, gymnastics becomes a good sport for children because it can train coordination, strength, agility, and flexibility, even fine motor skills (Yoga et al., 2025). In this way, gymnastics indirectly provides positive factors that are visible and observable. Visibly, children seem to develop coordination of the eyes, hands, and feet. Observably, children can develop in height and weight.

Ennis (2017) explains that effective physical education is a school program designed to move children toward lifelong physical activity. The goal of quality physical education is to guide children in the process of becoming physically active for life. The implementation of physical education in elementary schools is very important, because through physical education children are unconsciously trained to develop their motor skills optimally. In general, according to McDonough et al. (2020), physical activity has a positive impact on child development, especially on basic motor skills (running, jumping, throwing, and catching). Movement in physical activities is fundamental for humans to understand the world and themselves, naturally developing in line with the times. One of the subjects

taught in elementary schools is forward gymnastics, which aims to develop students' movement coordination, physical strength, and body endurance. Empirical research evidence (Paedi & Hadi, 2022) show that the implementation of music-based rhythmic gymnastics at SDN Kertagena Tengah 4 can improve rhythm accuracy, postural control, participation, motivation, confidence, and encourage peer tutoring. These findings reinforce the importance of innovative learning, and appropriate learning models can optimize physical education learning. Therefore, teachers act as a stimulus for children to be active outside the classroom and in their environment with confidence (Lastyaningsih et al., 2025). Children at the elementary school level have good development that can provide a foundation for the future if it is regularly nurtured correctly.

A learning model is a method or strategy used by a Physical Education teacher to create a learning process for students in order to achieve a goal that is designed systematically. However, many teachers still do not use a variety of learning models because they believe that changing the learning model makes it difficult for students to understand the material and for teachers to apply the learning model due to a lack of facilities and infrastructure, resulting in less effective learning. The lack of infrastructure and facilities in physical education also results in students being less active, having limited social skills, and decreased curiosity motivation (Apri Ebrata Purba et al., 2024). There are still teachers who use linear pedagogy with a Teacher-Centered Learning (TCL) approach, making the teacher more dominant than the students. The TCL model is considered to make students passive, rarely engage in discussions, and have no space to express their opinions. Therefore, the implementation of Student-Centered Learning (SCL) is needed, with the expectation that students will be more creative, innovative, interactive, and inspiring (Rozali et al., 2022).

The research by Srianto et al. (2024) found an innovative model called the Coaching Games For Upgrading Performance Model (CGFU-PM 515) which is highly relevant for training children because with this model, children think they are playing but are actually practicing. The concept of CGFU-PM515 is one of the alternative approaches in developing training or sports learning processes, consisting of four stages: innovation games, natural games action, coaching approach, and assessment of performance and skills. In CGFU-PM 515, it provides teachers the opportunity to innovate and express their creativity in designing games that are easy, inexpensive, enjoyable, achieve the desired goals, and always end with measuring the changes in students' abilities. This model is recommended for teachers because it can enhance students' participation, motivation, cognitive abilities, and fitness (Syamsuar & Zen, 2021). With this model, an improvement in skills, understanding, and attitudes is expected. From the CGFU-PM515 concept above, the following details are explained from stages 1-4.
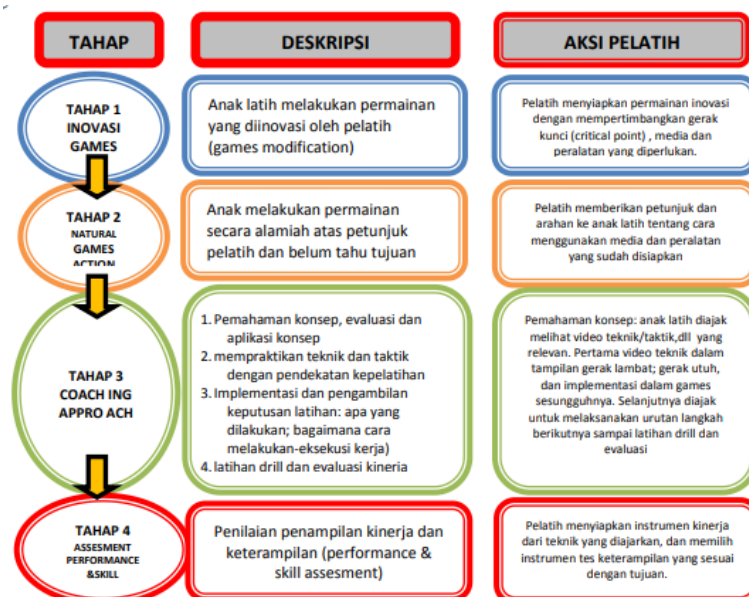

Figure 1. Concept of CGFU-PM 515 (Siswantoyo, 2018)

Basic movements are fundamental abilities that serve as the foundation for mastering more complex motor skills. Basic movements are divided into locomotor, non-locomotor, and manipulative movements (Gallahue et al., 2012). The forward roll falls into the category of non-locomotor movements, which require coordination, balance, strength, and body flexibility. The forward roll is an important topic in Physical Education learning in elementary schools because it can train students' courage, body control, and movement awareness. However, mastery of the forward roll skill often encounters obstacles, especially if the learning process is monotonous and does not provide opportunities for movement exploration (Mahendra, 2017). The purpose and urgency of this study stem from the fact that the Physical Education learning model based on CGFU PM-515 to improve forward roll learning outcomes in elementary school students in Sleman Regency is not yet known.

METHOD

This study examines the effect of CGFU PM-515-based physical education learning model on improving forward roll skills in elementary school students in Sleman Regency. The method used in this study is a quasi-experimental method. The experiment conducted in this study used a one-group pretest-posttest design as the data collection technique.

This study used 4 (four) elementary schools for the research, namely: (a) SD Negeri Condongcatur, (b) SD Muhammadiyah Condongcatur, (c) SD Negeri Deresan, and (d) SD Negeri Percobaan 2. The sample in this study is:

Table. 1 Research Sample

No	Schools	Number of Samples
1.	SD Negeri Condongcatur	27
2.	SD Muhammadiyah Condongcatur	36
3.	SD Negeri Deresan	28
4.	SD Negeri Percobaan 2	26
	Amount	117

Data collection can be conducted from various sources and in various ways. The data analysis technique uses quantitative descriptive analysis, employing a difference test to compare the average improvement between the data from the first meeting (pretest) and the second meeting (posttest). Data analysis using the t-test is carried out by comparing the pretest results with the posttest results. Before analyzing the data using the t-test, the requirements must meet the normality test to determine whether the data is normally distributed and the homogeneity test to check whether the variances are equal across groups (Iskandar et al., 2025).

Hypothesis testing is conducted using a t-test with the assistance of the SPSS 23 program. Hypothesis testing involves comparing the means between group 1 (pretest) and group 2 (posttest). If the calculated t value is less than the table t value, then Ha is rejected; if the calculated t value is greater than the table t value, then Ha is accepted.

If the data are either not normal or not homogeneous, then instead of the parametric statistic of the paired samples t-test, a non-parametric statistic in the form of the Wilcoxon test is used. The Wilcoxon test is often used as a non-parametric test for paired data and can analyze score changes from pre-test, post-test, to follow-up (Adamčák et al., 2025).

RESULTS AND DISCUSSION

Before performing statistical analysis, it is important to first conduct a normality test and a homogeneity test. The normality test is conducted using the Kolmogorov-Smirnov formula with the help of SPSS 23. The criterion used to determine whether a distribution is normal is that if $p > 0.05$, the data used in the study has a normal distribution; however, if $p < 0.05$, the distribution is considered not normal. The summary of the normality test results is:

Table 2. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Skill Pretest	Skill Postest	Knowledge Pretest	Knowledge Postest	Attitude Pretest	Attitude Postest
N		117	117	117	117	117	117
Normal Parameters^{a,b}	Mean	5.8974	7.4188	81.1795	84.0342	8.5983	10.0855
	Std. Deviation	.67447	.80128	2.14804	2.66501	1.03441	1.04694
Most Extreme Differences	Absolute	.304	.289	.273	.180	.497	.253
	Positive	.286	.289	.273	.132	.349	.191
	Negative	-.304	-.207	-.155	-.180	-.497	-.253
Test Statistic		.304	.289	.273	.180	.497	.253
Asymp. Sig. (2-tailed)		.000^c	.000^c	.000^c	.000^c	.000^c	.000^c

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Normality testing was conducted using the Kolmogorov-Smirnov test with the assistance of SPSS 26.0 for Windows. The analysis results showed that the data were not normally distributed because all variables had a significance value of 0.000, which is less than the significance level of α = 0.05. Therefore, it can be concluded that all data for all variables were not normally distributed. This indicates that the pretest and posttest data, in terms of skills, knowledge, and attitudes, did not meet the normality assumption.

Homogeneity is stated if p > 0.05, then the test is declared homogeneous, but if p < 0.05 then the test is considered not homogeneous. The results of the research homogeneity test are as follows:

Table 3. Homogeneity Test Results

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Skill	Based on Mean	12.316	1	232	.001
	Based on Median	5.171	1	232	.024
	Based on Median and with adjusted df	5.171	1	220.530	.024
	Based on trimmed mean	11.553	1	232	.001
Knowledge	Based on Mean	10.135	1	232	.002
	Based on Median	6.896	1	232	.009
	Based on Median and with adjusted df	6.896	1	231.256	.009
	Based on trimmed mean	10.615	1	232	.001
Attitude	Based on Mean	2.006	1	232	.158
	Based on Median	12.402	1	232	.001
	Based on Median and with adjusted df	12.402	1	199.215	.001
	Based on trimmed mean	6.407	1	232	.012

From the table above, it can be seen that the significance values of the Levene's test for the skills variable (0.001) and the knowledge variable (0.002) have significance values smaller than α = 0.05. Thus, it can be concluded that the data for the skills and knowledge variables are not homogeneous. Meanwhile, the significance value of the Levene's test for the attitude variable (0.158) has a

significance value greater than $\alpha = 0.05$. Therefore, it can be concluded that the data for the attitude variable is homogeneous.

The independent sample t-test is used to determine whether there is a difference between the means of two unpaired samples. The main requirement for the independent sample t-test is that the data are normally distributed and homogeneous (not absolute). If the sig. (2-tailed) value < 0.05, then there is a significant difference from the analysis of this research data, which is normally distributed and homogeneous. The following are the results of the Independent Sample T-test using the help of SPSS 25 for Windows.

Based on the results of the normality and homogeneity tests, it was shown that the data are not normally distributed and not homogeneous. Therefore, as a substitute for parametric statistics in the form of a paired samples t-test, non-parametric statistics in the form of the Wilcoxon test are used. The Wilcoxon test is used to determine whether there is a difference in the means of two paired samples. The Wilcoxon Signed Ranks Test is as follows:

Table 4. Wilcoxon Signed Ranks Test

Test Statistics[a]

	Skill Postest – Skill Pretest	Knowledge Postest– Knowledge Pretest	Attitude Postest – Attitude Pretest
Z	-9.478[b]	-8.572[b]	-8.892[b]
Asymp. Sig. (2-tailed)	.000	.000	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

The Wilcoxon test results for the variables of skills, knowledge, and attitude obtained significance values of 0,000<0,05; then H_0 can be rejected, and Ha accepted, so it can be concluded that there is a difference in the means between group 1 (pretest) and group 2 (posttest) in the variables of skills, knowledge, and attitudes.

Based on the results of the Wilcoxon Signed Ranks Test, it is known that there is a significant difference between the pretest and posttest scores in the variables of forward roll skills, knowledge, and attitudes. This indicates that physical education learning based on CGFU PM-515 can have a significant effect on improving students' abilities, as follows:

1. The CGFU PM-515-based Physical Education Learning Model is able to make students active

The CGFU PM-515 based physical education learning model provides extensive opportunities for students to actively engage in the learning process. Learning is designed in the form of challenging activities that align with the characteristics of the students, encouraging them to participate optimally. The challenges presented in each activity ensure that students are not just recipients of information but are also directly involved in the learning process through physical practice.

In addition, CGFU PM-515-based learning is also able to create an enjoyable learning atmosphere. Students feel happy because the learning uses various media, such as interesting pictures and videos, as well as a variety of learning aids. This condition makes students more motivated, less easily bored, and more enthusiastic in participating in forward roll exercise lessons.

2. The CGFU PM-515-based Physical Education Learning Model is able to foster students' courage

Students' courage can develop through the implementation of CGFU PM-515-based physical education learning because the lessons are designed gradually and provide students with the opportunity to try, repeat, and improve movements. The use of images and video media helps students understand movements more clearly, making them more confident to practice them.

In addition, when students make mistakes in performing movements, they do not feel afraid to try again because the learning process emphasizes improvement and skill development, not just the final outcome. Thus, this learning approach can foster courage, self-confidence, and perseverance in participating in learning activities.

CONCLUSION

Based on the research results and discussion, it can be concluded that the CGFU PM-515-based physical education learning model has been proven effective in improving forward roll skills in elementary school students in Sleman Regency.

The statistical test results indicate that the data are not normally distributed and some are not homogeneous, so hypothesis testing was conducted using the Wilcoxon Signed Ranks Test. The Wilcoxon test results show a significant difference between pretest and posttest scores in the variables of skills, knowledge, and attitude, with a significance value of $0.000 < 0.05$. This proves that the implementation of the CGFU PM-515 model has a real and significant impact on improving students' abilities.

The implementation of the CGFU PM-515 learning model is able to create active, enjoyable learning and foster students' courage, thereby not only improving motor skills but also strengthening knowledge comprehension and positive attitudes in participating in Physical Education learning on forward roll floor exercise material. Thus, it can be concluded that the CGFU PM-515-based physical education learning model is feasible and recommended for use by PE teachers as an alternative innovative learning model to improve the quality of floor exercise learning in elementary schools.

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