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The Effectiveness of Breaststroke Swimming Training Models and Swimming Style Variation Methods at the ESC Swimming Club (Embrio Swimming Club)

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Abstract
This study aims to determine the effectiveness of the breaststroke swimming training model using the variation method for athletes at the ESC Swimming Club (Embrio Swimming Club). The background of the study is based on the finding that many athletes have difficulty mastering breaststroke techniques, especially the coordination of hand, leg, and breathing movements, due to monotonous conventional training methods. The research method used was an experiment with a one-group pretest-posttest design. The research sample consisted of 10 athletes selected using a purposive sampling technique. The treatment in the form of a variation training model was given for six meetings in two weeks, including training on land using resistance loop bands and training in water using a pullboy. The research instrument was a breaststroke swimming skills test covering five aspects: gliding, leg movement, hand movement, breathing, and coordination. The results of the analysis showed an increase in the average score from 51.50 in the pretest to 85.00 in the posttest. Normality and homogeneity tests showed that the data were normally distributed and homogeneous. The paired sample t-test produced a significance value of 0.0001 (<0.05), so it can be concluded that there was a significant difference between the results before and after the treatment. This proves that the swimming style variation training model is effective in improving breaststroke technique skills. Implementing this method can be an alternative strategy for coaches to optimize athlete performance, reduce boredom, and motivate athletes during training.

Kata kunci: Breaststroke Swimming, Exercise Variations, Swimming Style.

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INTRODUCTION

Swimming is a popular aquatic sport among various groups, both for recreational and competitive purposes. The breaststroke is a basic technique widely studied because it is considered easy to perform, has a moderate speed, and allows the swimmer to maintain a head-up position, making breathing easier (Kusumawati & Wahyudi, 2024). However, mastering the correct technique is still necessary for swimmers to move efficiently and achieve optimal performance. Incorrect technique, particularly in the coordination of hand, leg, and breathing movements, can hinder athletes' performance (Amri et al., 2022). Several studies have examined the effectiveness of various breaststroke training methods. Priana (2019) found that the use of a pullboy can significantly improve breaststroke technique in swimming club athletes. Another study by Rahmadani et al. (2023) developed a breaststroke training model for

beginners using the ADDIE method, which was found to be valid, practical, and effective in improving athlete skills. Meanwhile, Ishak (2016) showed that a playful approach to swimming learning yielded better results than conventional methods. These findings suggest that a variety of training methods has the potential to improve swimming technique. Although numerous studies have been conducted on swimming training methods, most still focus on the use of a single piece of equipment or a specific approach without a structured combination of land and water training. However, varied training, combining the use of resistance loop bands on land and pullboys in the water, can help improve body position, increase muscle strength, and improve movement coordination (Munawaroh et al., 2023).

This combined approach is rarely found in previous research and therefore offers the potential for new contributions to the development of breaststroke training methods. Observations at the ESC (Embrio Swimming Club) Swimming Club revealed that some athletes experience difficulty mastering hand and leg coordination and proper breathing techniques. Current training tends to be conventional, repetitive, and lacks variety, resulting in athlete boredom and slow skill development. This situation highlights a research gap between training methods used in the field and innovative training models that integrate a variety of land and water movements. The uniqueness of this research lies in the application of a breaststroke training model using a variation method, combining land training using resistance loop bands with in-water training using a pullboy. This model is designed to simultaneously improve strength, coordination, and movement technique, while reducing athlete fatigue. This approach differs from previous research, which generally focuses on training on a single medium or technique.

In terms of scientific contribution, this research is expected to provide a more effective alternative strategy for swimming coaches in improving athlete skills, particularly in breaststroke. Furthermore, the results of this study can serve as a reference for developing more varied, structured, and enjoyable swimming training programs, thus positively impacting athlete motivation to train consistently (Hasibuan & Syafrayani, 2024). Based on this description, the purpose of this study was to determine the effectiveness of the breaststroke training model using a variation method on athletes at the ESC Swimming Club. This study is expected to provide empirical evidence that a training model combining variations of land and in-water training can significantly improve breaststroke technical skills.

METHOD

This study was conducted using an experimental approach and a one-group pretest-posttest design. This design was chosen to measure changes in athletes' abilities before and after treatment, including breaststroke training using a variation of swimming styles. In this design, the same group was given a pretest, followed by a training program, and concluded with a posttest. Comparison of the two measurement results was used to assess the effectiveness of the treatment. The study was conducted at the ESC (Embrio Swimming Club) Swimming Club in West Bandung Regency. The study lasted two weeks, with training sessions occurring three times a week, for a total of six training sessions. Each training session consisted of land exercises using resistance loop bands and water exercises using a pullboy.

The population in this study was all 30 swimmers belonging to the ESC Swimming Club. Sampling was conducted using a purposive sampling technique based on predetermined criteria, namely athletes who actively participated in training and met the physical requirements for participation in the program. From this population, 10 athletes were selected as the study sample. The data measurement instrument used a breaststroke swimming skills test that covers five aspects: gliding, leg movements, arm movements, breathing movements, and coordination of all movements. The assessment was conducted by a swimming coach using a predetermined assessment format. The data obtained were analyzed through several stages. The prerequisite analysis tests included a normality test using the Kolmogorov-Smirnov method and a homogeneity test using the Levene test. After the prerequisites were met, a paired sample t-test was conducted to determine significant differences between the pretest and posttest results. The significance level used was $\alpha = 0.05$.

RESULTS AND DISCUSSION

Result

Based on research data from the initial pretest on swimmers at the ESC swimming club, a two-week training session with a frequency of six sessions was conducted, followed by a final posttest. This was to determine whether there were any changes after the two weeks of treatment or training. The following are the pretest and posttest results.

Table 1. Pretest and Posttest Results

No	Name	Skore Pretest	Skore Postest
1	PD-1	40	90
2	PD-2	45	80
3	PD-3	35	80
4	PD-4	40	75
5	PD-5	45	85
6	PD-6	60	85
7	PD-7	60	85
8	PD-8	65	85
9	PD-9	50	90
10	PD-10	75	95

The results of the descriptive statistical analysis of the pretest and posttest of the Breaststroke Swimming Learning Model with the Swimming Style Variation Method are as follows:

Table 2. Description of Pretest and Posttest

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Pretest eksperimen	10	35	75	515	51.50	12.921
Postest eksperimen	10	75	95	850	85.00	5.774
Valid N (listwise)	10					

Based on the Descriptive Statistics table above, it is known that the number of samples (N) for the pretest and posttest data of the experimental group is 10 students each. In the pretest results, the minimum score obtained by students was 35 and the maximum was 75, with a total score of 515 resulting in an average score (mean) of 51.50 and a standard deviation of 12.921, which indicates a fairly large spread of scores among students. Meanwhile, in the posttest results, the minimum score increased to 75 and the maximum reached 95, with a total score of 850 and an average score of 85.00. The posttest standard deviation of 5.774 indicates that student learning outcomes after treatment tended to be more even and stable. This indicates a significant increase in the average student learning outcomes after treatment was given in the experimental group.

The normality test is used to determine whether the data obtained from research results is normally distributed. This test uses the Kolmogorov-Smirnov test. Data are considered normally distributed if the normality test value is greater than 0.05 (p > 0.05)..

Table 3. Normality Test

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest eksperimen	.193	10	.200*	.936	10	.510
Postest eksperimen	.200	10	.200*	.953	10	.703

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the results of the Normality Tests in the table above, the normality test for the pretest and posttest data of the experimental group was obtained using two methods, namely the Kolmogorov-Smirnov and Shapiro-Wilk. In the Shapiro-Wilk test, which is more suitable for small samples (n < 50), a significance value (Sig.) of 0.510 was obtained for the pretest and 0.703 for the posttest. Both significance values are greater than 0.05, which means that the pretest and posttest data are normally distributed. Similar results were also shown by the Kolmogorov-Smirnov test, with a significance value of 0.200 each (marked as the lower limit of the actual significance). Therefore, it can be concluded that the pretest and posttest data in the experimental group meet the assumption of normality.

The homogeneity test is useful for assessing sample similarity, that is, whether the variances of samples taken from a population are uniform. The results of this research's homogeneity test are as follows:

Table 4. Homogeneity Test

Test of Homogeneity of Variances			
Hasil Pretest dan Postest			
Levene Statistic	df1	df2	Sig.
.000	1	18	0,7

Based on the Test of Homogeneity of Variances table above, the test was conducted to determine whether the variance between the pretest and posttest results was similar or homogeneous. The Levene Statistic value of 0.000 with degrees of freedom (df1 = 1 and df2 = 18) produced a significance value (Sig.) of 0.7. Because the significance value is greater than 0.05, it can be concluded that the variance between the pretest and posttest results is homogeneous or there is no significant difference in variance. Thus, the assumption of homogeneity of variance is met, which is an important requirement for further statistical analysis such as the t-test.

A hypothesis test was conducted to determine whether there was a significant difference between the pretest and posttest results after two weeks of breaststroke swimming training with a variation of swimming styles. This test aimed to assess the effectiveness of the treatment in improving athletes' swimming technique. The hypothesis test data can be seen in Table 5:

Table 5. Hypothesis Testing

Paired Samples Test

	Paired Differences						
				95% Confidence Interval of the Difference			
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	Sig. (2-dftailed)
Pair 1 Pretest eksperimen - Postest eksperimen	-33.500	10.554	3.337	-41.050	-25.950	-10.037	9 .0001

Based on the results of the Paired Samples Test in the table above, the average difference (mean difference) between the pretest and posttest scores was -33.500 with a standard deviation of 10.554 and a standard error of the mean of 3.337. This difference value indicates that the posttest score is significantly higher than the pretest. The 95% confidence interval for the score difference ranges from -41.050 to -25.950, which means that all values in this range are below zero, confirming that there is a negative decrease from pretest to posttest (meaning there is a positive increase in scores from posttest to pretest). The t-value of -10.037 with 9 degrees of freedom (df) and a significance value (Sig. 2-tailed) of 0.0001 (<0.05) indicates that there is a statistically very significant difference between the pretest and posttest results. Thus, it can be concluded that the breaststroke swimming learning model with the Swimming Style variation method has a significant influence on improving athletes' swimming abilities after being given treatment for two weeks..

Discussion

Based on the results of a study conducted on 10 swimmers from the ESC club, a significant improvement in swimming ability was observed after two weeks of breaststroke training using the swimming style variation method. This was evident in the average pretest score of 51.50, which increased to 85.00 in the posttest. Furthermore, the minimum and maximum scores also increased from 35–75 to 75–95. This improvement indicates that almost all athletes experienced significant improvement in their breaststroke technique.

The pretest standard deviation of 12.921 indicated that the distribution of scores before the treatment was quite wide and uneven. However, after the treatment, the standard deviation decreased to 5.774, indicating that the students' abilities after the treatment became more homogeneous and stable. This means that not only did this method improve individual abilities, but it also created uniform performance improvements among participants. This confirms that the use of the swimming style variation method is not only effective in improving skills but also in producing more equitable results.

The results of the normality test showed that the pretest and posttest data were normally distributed, with significance values greater than 0.05 based on both the Kolmogorov-Smirnov and Shapiro-Wilk tests. This provides a strong basis for conducting parametric tests, such as the t-test. Furthermore, the results of the homogeneity test also indicated that the variance between the pretest and posttest results was homogeneous (Sig. = 0.7), thus strengthening the validity of the hypothesis test results. Thus, the data obtained met the basic assumptions of inferential statistical analysis.

The results of the hypothesis test using a paired sample t-test revealed a significant difference between the pretest and posttest results, with a p-value of 0.0001 and a calculated t-value of -10.037. The 95% confidence intervals were also all below zero, indicating an increase in scores after the treatment. This demonstrates that the breaststroke swimming learning model using the swimming style variation method can have a significant impact on improving the athletes' swimming technique.

The results of this study align with those of previous research conducted by Salsabilla (2020), which stated that the use of variation methods in swimming lessons can significantly improve movement technique in high school students. Furthermore, research by Purnamaningsih, I.R. (2019) also found that implementing a learning method based on swimming variations can improve students' movement efficiency and endurance in breaststroke swimming. The similarities between these studies demonstrate the consistent findings that

innovative and varied learning models have a positive impact on swimming technique performance.

Based on the results and reinforcement from various previous studies, it can be concluded that the application of the swimming style variation method in breaststroke learning is highly recommended for implementation in training programs for young athletes. It not only improves technical skills but also creates a more engaging, dynamic, and effective training environment. This provides a foundation for coaches and physical education teachers to develop learning strategies that adapt to the needs and potential of students.

CONCLUSION

Based on the research results, it can be concluded that the breaststroke swimming training model using a swimming style variation method that combines training on land using resistance loop bands and training in the water with a pullboy has proven effective in improving breaststroke swimming technique skills in ESC Swimming Club athletes. The improvement is seen from the significant difference between the pretest and posttest scores, where the average skill score of athletes increased after participating in the training program for six meetings. These results indicate that the implementation of structured training variations is not only able to improve the coordination of hand, leg, and breathing movements, but also provides a more interesting training experience, reduces boredom, and increases athletes' motivation to train consistently. Thus, this training model can be recommended as an alternative strategy for coaches in an effort to improve the performance of swimming athletes, especially in breaststroke..

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