



Effect of freestyle swimming learning using a visualization model on the development of students' basic movements

M. Aditya Ramdhani^{1ABCDE*}, Z. Arifin^{2BCDE}, Ani Kurniawati^{3CDE}

¹ Physical Education, Health and Recreation, Universitas Garut, Indonesia

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Abstract: This study aims to determine the effectiveness of freestyle swimming learning using a visualization model on the development of students' basic movements at SDN Mekargalih 4. The background of the study stems from the problem of low understanding of freestyle swimming techniques in students, especially related to the coordination of hand, foot, breathing, and body position movements. The visualization model was chosen because it provides concrete examples of movements through videos, images, and visual demonstrations, making it easier for students to understand the techniques more clearly. The study used a pre-experimental method with a one-group pretest–posttest design. The research subjects consisted of 20 students (10 boys and 10 girls). The instrument used was a test of basic freestyle swimming movement abilities which included body position, leg movement, arm movement, breathing, and coordination. The results showed a significant increase in scores. In the boys' group, the average score increased from 11.6 to 12.7 (a difference of 1.1). In the girls' group, the average score increased from 9.7 to 11.2 (a difference of 1.5). The prerequisite test showed that the data were normally distributed, with the Shapiro-Wilk pretest value = 0.170 and posttest = 0.178 ($p > 0.05$). The data were also homogeneous, with the homogeneity test results of the pretest = 0.716 and posttest = 0.834 ($p > 0.05$). Analysis using paired sample t-test showed that there was a significant difference between the pretest and posttest scores with a calculated t value = 5.151, $df = 19$, and $Sig. = 0.000 < 0.05$. Thus, it can be concluded that learning freestyle swimming with a visualization model has a significant effect on improving students' basic movement abilities. Overall, the visualization model has proven effective in helping students understand freestyle swimming techniques, improving motor coordination, and making the learning process more interesting and easier to understand.

Keywords: Freestyle Swimming; Visualization Model; Basic Movement; Learning Effectiveness; Physical Education.



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Corresponding author: : M. Aditya Ramdhani, email: madityaramdhani2@gmail.com

Introduction

Sport is a physical activity that plays a vital role in maintaining physical health and improving the quality of life. Through sport, individuals can improve physical fitness, mental health, and social skills. In an educational context, sport is also an effective learning tool for developing motor skills, sportsmanship, and the ability to cooperate among students (Bailey, 2018). Physical education

in elementary schools deserves special attention, as elementary school children are in a period of growth and development. Physical education also shapes a healthy quality of life for children, with children's awareness determining the importance of physical activity as a basic need in their lives and a lifelong commitment. (Kurniawati, Rizky Baresi, et al., 2022). Physical education is so broad and not only to improve the quality of movement of its students, physical education will directly influence the educational process as a whole, namely developing cognitive, affective, psychomotor and social aspects. (Kurniawati, Nurdiansyah, et al., 2022) Physical education in schools is designed to provide learning experiences through structured physical activities that can support the overall development of students, both physically, cognitively, and affectively (Kirk, 2010). According to Ayu Nabillah et al., (2022) Sport is a human movement activity using specific techniques that combines elements of play, a sense of relaxed enjoyment, and self-satisfaction. Sport can be defined as a type of human body movement performed using specific techniques, which not only emphasizes the physical aspect but also contains elements of play and recreation that are carried out in a relaxed and stress-free manner, thus creating a sense of pleasure and comfort for those who participate. Sport does not always mean competing or achieving success; it can also be a way to improve quality of life, balance emotions, and release energy. Sport can make people feel motivated, happy, and satisfied by successfully performing movements or completing certain physical challenges. This is all because sport incorporates elements of play into well-designed physical activities. Sport also builds personality, improves motor skills, and maintains physical and mental health. Therefore, sport is not just a physical activity; it also offers an opportunity to relax, learn, develop oneself, and achieve overall balance in human life. According to Alamsyah et al., (2019) Sport is a positive physical activity that can improve physical and spiritual health and can encourage, foster and develop physical, spiritual and social potential.

Based on several expert opinions and references from various journals previously mentioned, it can be concluded that sport is essentially a type of physical activity carried out systematically, regularly, and planned with various goals depending on the context. This conclusion is based on expert opinions and references from various previously published journals. Sport plays

a significant and comprehensive role in human life because it can influence a person's physical, mental, social, and spiritual development.

In the world of sports, various types of sports are classified according to various criteria, including the type of activity carried out and the media or environment in which the sport takes place. The purpose of this classification is to facilitate the understanding, grouping, and development of each type of sport according to its characteristics. One of the large categories in this classification is aquatic sports, namely types of sports where all activities are carried out in or on water. This category includes various types of sports that use water as the main medium, such as pool water or open waters such as the sea, lake, or river. One of them is swimming. According to Yudha Prawira et al., (2021) Swimming is a water activity with many different styles that has been around for a long time and offers numerous benefits to humans. Basic techniques form the foundation that students must master from an early age so they can progress to more complex swimming techniques. However, in many schools, aquatics learning faces various challenges in terms of facilities, human resources, and limited teaching methods or models. (Zhafran Mulya et al., 2025). According to (Kurniasih et al., 2024) Swimming is a popular water sport because it engages nearly every muscle in the body. Therefore, it is highly beneficial for health and helps maintain a fit body. Swimming is a movement performed in water. Swimming helps build muscle because it engages all the body's muscles. Furthermore, swimming also helps build self-confidence, courage, and independence. In health science, swimming is also used as a water therapy medium that can help cure various ailments. Swimming is an activity performed in water, with various forms and styles that have long been known to provide many benefits to humans. The benefits of swimming include maintaining and improving fitness, maintaining physical health, promoting personal safety, strengthening muscles and physical growth in children, and serving as an educational tool.

One sporting activity that offers numerous benefits for health and motor development is swimming. Swimming engages almost all the muscles in the body, effectively improving cardiovascular fitness, muscle strength, and coordination (Tanaka H, 2009). Swimming is a water

sport, which involves various movement techniques known as swimming strokes. Each stroke has unique characteristics, techniques, and training objectives. The world of swimming boasts many different strokes used in basic lessons and official competitions, including breaststroke, backstroke, and butterfly. Each stroke requires different coordination, muscle strength, and breathing techniques. For example, freestyle allows swimmers to move quickly due to its regular and efficient movements. According to Setiawan & Denay, (2022) Freestyle swimming is swimming with your chest facing the water's surface, similar to everyday walking. Freestyle is the fastest swimming style compared to other swimming styles.

The basic principles that determine the efficiency of swimming technique are stroke mechanics, body position, and rhythm. Furthermore, physical abilities (strength, speed, agility, flexibility, balance, endurance, power, and coordination) are also equally important. According to Prayogo et al., (2023) Freestyle crawl is a freestyle swimming style performed with the body face down on the surface of the water. The arm movement is swung forward paddling then the catch phase and the water is swept underwater then back again with a combination of alternating left and right hands followed by the movement of the legs up and down to adjust to the breath. The basic movements of freestyle swimming include several main components such as gliding, leg movements (flutter kick), arm movements (pull and recovery), breathing, and coordination of all movements. According to Subagyo (2018) mastery of these basic movements is very important because it is the foundation in developing good and efficient swimming skills. Without a proper understanding of basic movements, students will have difficulty in mastering overall swimming techniques. . According to Rohendi et al., (2017) One of the benefits of swimming is improving motor skills. Motor skills are all body movements, including unobservable internal movements (motor), namely the capture of stimuli by the senses - the delivery of stimuli by the sensory nervous system to the brain (memory) - processing and decision-making by the brain - the delivery of decisions by the motor nervous system to the muscles, and observable external movements (movement). Motor development is an aspect of motor behavior and motor control related to

changes in motor performance throughout the lifespan. Motor development includes: first, the development of essential movement abilities and second, mastery of movement skills.

On the other hand, freestyle swimming requires gradual motor skills to perform all the movements demonstrated. Furthermore, educators who teach freestyle swimming skills to their students lack creativity, such as giving speeches beside the pool without demonstrating or diving directly into the pool, which prevents them from understanding the basic movements of freestyle swimming. To ensure that the learning process runs smoothly and is of high quality, teachers and instructors in schools must be able to develop various learning models with the help of media that are applied to practical learning. In this context, the visualization model assisted by video media is one learning model that can be used. Sensitivity to the processing of information received by someone through hearing, sight, or feeling is known as motor learning, according to the visualization learning model. Video media functions as a tool to convey information or messages by displaying moving images and sound together. Therefore, they can show events continuously and support the learning process well. At the very least, students can observe and correct the correct freestyle swimming technique. This is because the use of demonstrations through initial props, namely models, is considered ineffective because students cannot focus on the swimming movements due to the refraction of the water in the pool. Therefore, videos that can be viewed on the internet can be used as a demonstration medium to demonstrate swimming movements properly and correctly, because the focus of the movements is displayed through several sides taken using a special underwater camera.

The increasingly sophisticated world demands that humans become wiser in facing the various challenges of our time. "Innovation in education will certainly achieve its goals if the learning model being developed utilizes the appropriate learning strategies and media."(Hasanudin et al., 2024)One potential approach is the use of visualization models in the learning process. The use of video as a learning medium has been shown to improve students' understanding of movements, as they can directly observe the correct technique and then imitate it. Research conducted bySanjaya, (2022)with the title "Video-Assisted Learning of Freestyle

Swimming Training Models on Freestyle Mastery and Swimming Speed of Elementary School Students" shows that swimming learning with the help of video training models has a positive impact on student learning outcomes. In his research, students who learned using videos showed a more significant increase in swimming skills compared to students who learned using conventional methods. This occurs because videos allow students to repeatedly observe the movements being demonstrated, thus facilitating the process of internalizing the movements. Similar research was also conducted by Citra Rumondang et al., (2025) with the title The Effect of Visualization Learning and Practice on Freestyle Swimming Speed in Children Aged 10-13 Years at the Siger Sembilan Swimming Lensons Club Bandar Lampung. The results show that there is a significant effect of the visualization method on increasing swimming speed. Students who received material through video and direct practice experienced greater improvements than students who only received practice without video. This shows that the visualization model is able to accelerate the process of learning movement and has a positive impact on motor aspects such as coordination, speed, and accuracy of movement. Research shows that the use of video as a learning medium in physical education can improve students' motor skills because they can observe movement techniques more clearly before practicing them (Palao et al. 2015).

Based on the above, it can be concluded that sport is a type of physical activity that not only improves a person's physical fitness but also plays a significant role in an individual's mental, social, and emotional growth. Swimming, especially freestyle swimming, which requires coordination, strength, and good technical skills, is one of the most beneficial types of sport. Furthermore, because freestyle swimming involves comprehensive and structured body movements, especially in elementary school-aged children, it has been proven to improve their motor development. However, learning swimming skills in schools still faces challenges, particularly in terms of uncreative material delivery. Therefore, using a visualization learning model supported by video media can help students better understand freestyle swimming techniques. Students can improve their swimming technique more precisely by utilizing video media to view movements from various angles. Therefore, improving the quality of swimming learning in elementary schools can

be achieved by combining swimming sports, motor development, and visualization models. Therefore, researchers want to provide different teaching methods through visualization models based on the problems encountered. To ensure that students have a better understanding of what they are learning, teachers must think creatively when delivering information. The author wanted to create a method for delivering freestyle swimming material using a visualization learning model that utilizes video media. The author found that physical education teachers faced challenges in delivering the material, particularly regarding freestyle swimming.

Materials and Methods

Research Design

The method in this research uses an experimental method. The experimental method is a research method used to find the effect of certain treatments on others under controlled conditions. (Sugiyono, 2019:72). Experimental research is conducted by providing certain treatments to subjects, then observing the effects or changes that occur as a result of these treatments. In the context of physical education research, for example, teachers provide certain learning models (visualizations) to see their effects on(Placeholder2). In this study, quantitative research was conducted using the pre-experimental design method one group pretest-posttest (initial test final test single group). Research activities that include an initial test (pretest) before being given treatment, after being given treatment then giving a final test (posttest). This study involved all fifth grade students at SDN Mekargalih 4. Students at this level have basic motor skills that enable them to participate in swimming lessons, which makes this population selected, Data analysis techniques used are Statistical Description, Prerequisite Tests which include: normality test, homogeneity test and Hypothesis Test.

Research Instruments Data Analysis

This study, the instrument used was observation during the learning process. This was used to identify all incidents or events during the action and improvement process. Documentation (photographs) was used to record and document events during the direct action. Skills tests used student assessment sheets.

No	Nama Siswa	Komponen Gerak														
		Meluncur (Posisi Tubuh)			Gerakan Tungkai			Gerakan Lengan			Pengambilan Nafas			Koordinasi Gerak Keseluruhan		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1																
2																
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9																
10																

Figure 1. Student Assessment Sheet

Data Analysis

Validity and reliability tests were conducted before data collection. The data were analyzed using. This analysis was performed using SPSS version 27 software.

Results and Discussion

Results

The pretest results obtained the highest score = 14, the smallest score = 5, the average (mean) = 9.7 with SD = 3.05. While the posttest obtained the highest score = 15, the smallest score = 8, the average (mean) = 11.2, with SD = 2.53. The complete results can be seen in the following table:

Table 1. Description of Female Statistics

Statistika	Pretest	Posttest
N	10	10
Terbesar	14	15
Terkecil	5	8
Mean	9.7	11.2
SD	3.05	2.53

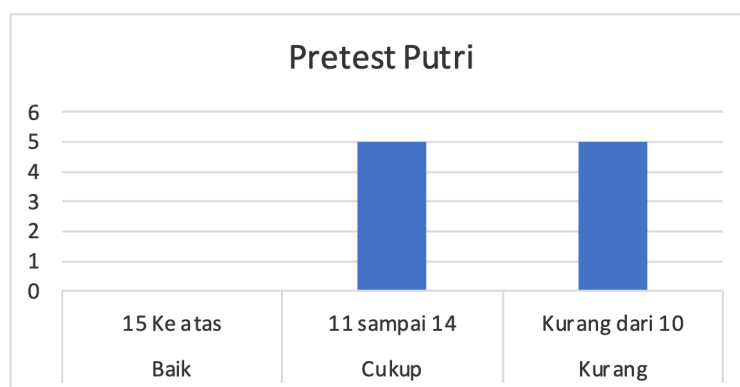


Figure 2. Female pretest diagram

Based on the tables and bar charts above, it is known that the basic freestyle swimming movement abilities of 10 students are divided into several categories. The good category has 0 students (0%), the adequate category has 5 students (50%), and the poor category has 5 students (50%).

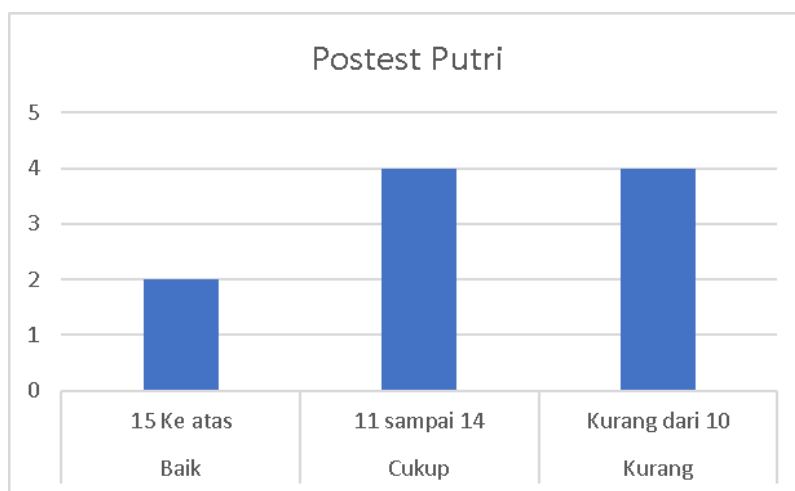


Figure 3. Female posttest diagram

Based on the tables and bar charts above, it is known that the basic freestyle swimming movement abilities of 10 students are divided into several categories. The good category has 2 students (20%), the sufficient category has 4 students (40%), and the poor category has 4 students (40%).

Description of Male Statistics

The pretest results obtained the highest score = 14, the smallest score = 9, the average (mean) = 11.6 with SD = 31.71. While the posttest obtained the highest score = 15, the smallest score = 10, the average (mean) = 12.7, with SD = 1.82. The complete results can be seen in the following table:

Table 2. Description of Male Statistics

Statistika	Pretest	Posttest
N	10	10
Terbesar	14	15
Terkecil	9	10
Mean	11.6	12.7
SD	1.71	1.82

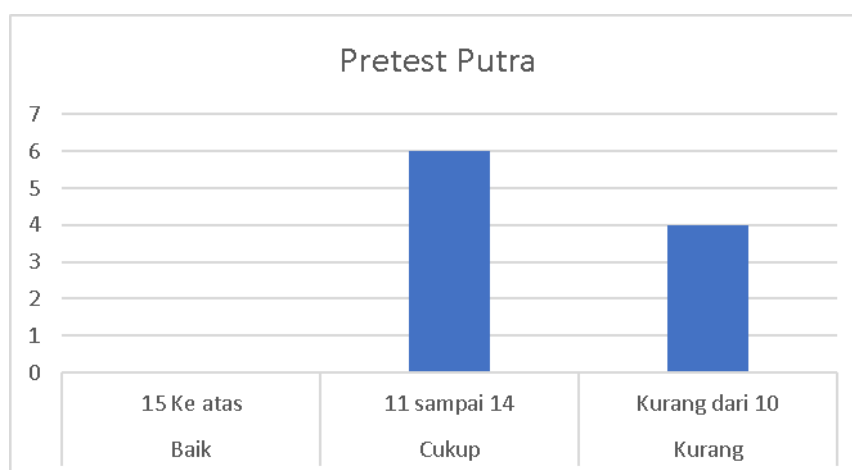


Figure 4. Male pretest diagram

Based on the tables and bar charts above, it is known that the basic freestyle swimming movement abilities of 10 students are divided into several categories. The good category has 0 students (0%), the sufficient category has 6 students (60%), and the poor category has 4 students (40%).

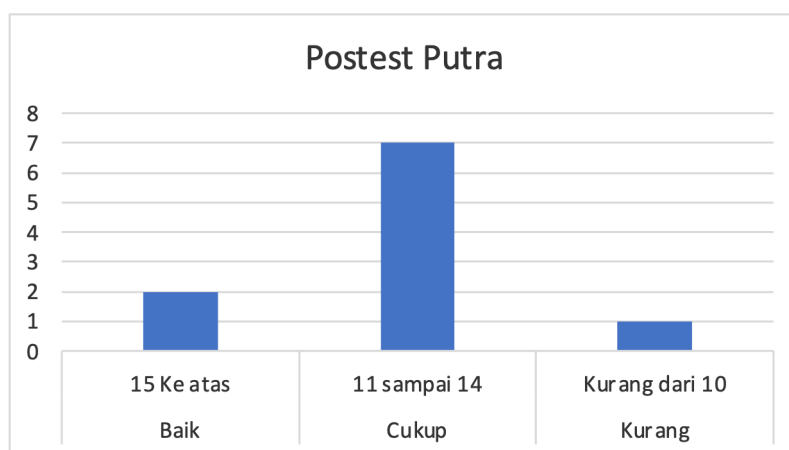


Figure 5. Male posttest diagram

Based on the tables and bar charts above, it is known that the basic freestyle swimming movement abilities of 10 students are divided into several categories. The very good category is 2 students (20%), the sufficient category is 7 students (70%), and the poor category is 1 student (10%).

Normality Test

The normality test was used to determine whether the data distribution of the variables in this study was normal. The normality test was calculated using the Shapiro-Wilk test formula in SPSS. The results of the normality test are presented in the table below:

Table 3. Normality Test Result

	Shapiro-Wilk		
	statistic	df	Sig.
Pretest	0.932	20	0.170
Posttest	0.933	20	0.178

Homogeneity Test

The homogeneity test is used to test the similarity of samples, namely whether the variance of samples taken from the population is uniform. The homogeneity rule states that if $p > 0.05$, the test is considered homogeneous, and if $p < 0.05$, the test is considered non-homogeneous. The results of this study's homogeneity test can be seen in the following table:

Table 4. Result of Homogeneity Test

	Df 1	Df 2	Sig.	Keterangan
Pretest	1	38	.716	Homogen
Posttest	1	38	.834	Homogen

The table above shows that the pretest value (significance $P > 0.05$) indicates homogeneity. Because all data are homogeneous, the analysis can be continued with parametric statistical tests

Hypothesis Test

The hypothesis test in this study was tested using the Paired Sample T-Test with the help of SPSS, the results of the hypothesis test are as follows:

The first hypothesis states, "There is an influence of the effectiveness of freestyle swimming learning with a visualization model on the development of students' basic movements." If the analysis results show a significant difference, then freestyle swimming learning with a visualization model has an influence on the development of students' basic movements. The conclusion of the study is stated as significant if the calculated t value is greater than the table t value and the sig. value is less than 0.05 (sig. < 0.05). Based on the analysis results, the data obtained in the following table:

Table 5. Paired sample T-test result

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig.(2-tailed)
				Lower	Upper			
Pretest-posttest	-1.300	1.129	.252	-1.828	-.772	-5.151	19	.000

The t-test results show that the calculated t-value is 5.151 and the t-value in the table is 2.861 (df 19; 0.05). The p-value for this test is 0.000, which indicates that the results are significant. Because the calculated t-value of 5.151 is greater than the critical t-value of 2.861

and the significance criterion of 0.000 is less than 0.05, there is a significant difference between the two groups. This shows that there is a significant influence of freestyle swimming learning with a visualization model on the development of students' basic movements.

Based on data analysis showing the development of basic movements in the group, the alternative hypothesis (H_a) that "there is an effective influence of freestyle swimming learning with a visualization model on the development of students' basic movements" can be accepted. Therefore, the visualization model in freestyle swimming learning has a significant impact on developing students' basic movements.

Discussion

The visualization learning model has been shown to have a significant impact on students' basic freestyle swimming movement skills. This is indicated by an increase in scores from the pretest to the posttest in both male and female student groups. The results of normality and homogeneity tests indicate that the data meet the requirements for analysis using parametric statistics. Thus, the t-test results can be considered valid and can be used as a basis for research decision-making. The results of the paired sample t-test showed a significance value of 0.000, which means there is a significant difference between the values before and after treatment. In other words, the alternative hypothesis is accepted, so the visualization model has a positive impact on the development of students' basic movement skills. The improvement in students' basic movement skills occurs because the visualization model helps students understand the movements concretely. Students can see examples of movements, pay attention to correct techniques, and compare them with their own movements. This makes the learning process easier to understand. Learning with the visualization model makes students more motivated and actively involved in the learning process.

Conclusion

Students appear more enthusiastic and excited in participating in swimming learning activities. This contributes to the improvement of basic freestyle swimming movement skills.

Overall, the visualization model in PJOK learning is very effective to use, especially for materials that require an understanding of complex movements such as freestyle swimming. This model is recommended to be applied to other swimming learning activities. Thus, learning freestyle swimming using a visualization model can be an alternative choice for PJOK teachers to improve the quality of learning while improving students' basic movement abilities.

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