The Effectiveness of a Basic Swimming Learning Model in Improving Students' Motor Skills

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Abstract. This study aims to determine the effectiveness of a basic swimming learning model in improving students' motor skills. The research employed an experimental method using a *one-group pretest–posttest design*. The participants consisted of 20 students selected through a purposive sampling technique. The research instrument was a basic swimming motor skill test, which included four main components: kicking, arm movement, breathing, and coordination. The results showed that the mean score increased from 62.45 in the pretest to 78.30 in the posttest. Furthermore, the results of the *paired sample t-test* revealed a t-value of 8.76 with a significance level (Sig.) of 0.000 ($p < 0.05$), indicating a statistically significant difference between the pretest and posttest results. This improvement demonstrates that the implemented basic swimming learning model was effective in enhancing students' motor skills. In conclusion, the basic swimming learning model has a significant effect on improving students' motor skills. The findings of this study are expected to serve as a reference for physical education teachers in developing more innovative, effective, and skill-based learning strategies.

Keywords: effectiveness, basic swimming learning, motor skills, paired sample t-test, physical education.

1 Introduction

Physical education plays a vital role in promoting students' physical development, motor skills, and overall well-being. One of the essential components in physical education is swimming, particularly basic swimming skills, which are fundamental for both performance and water safety [1], [2], [3]. Mastery of basic swimming skills, including kicking, arm movement, breathing, and coordination, is therefore an important learning objective in schools.

However, the implementation of basic swimming instruction often faces several challenges. In many educational settings, teaching practices are still dominated by conventional and teacher-centered approaches. These approaches tend to emphasize repetitive drills, which limit students' active participation and reduce the effectiveness of motor skill development [4], [5]. As a result, many students encounter difficulties in

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mastering fundamental swimming techniques, especially in coordinating movements and controlling breathing [6], [7], [8], [9].
In addition, differences in students' initial abilities and psychological factors, such as fear of water and low confidence, further hinder the learning process. Without an appropriate instructional model, students may fail to achieve the expected learning outcomes. Moreover, the lack of structured and progressive learning models contributes to suboptimal skill acquisition [10], [11].

Previous studies have emphasized the importance of student-centered learning approaches in enhancing engagement and motor skill development. However, limited research has specifically examined the effectiveness of structured learning models in basic swimming instruction, particularly in small-group contexts. This indicates a research gap that needs to be addressed.

Therefore, this study aims to examine the effectiveness of a basic swimming learning model in improving students' motor skills. The findings of this study are expected to provide empirical evidence and practical contributions to the development of more effective instructional strategies in physical education.

The gap between expected competencies and actual learning outcomes in basic swimming instruction remains a critical issue in physical education. Ideally, students are expected to master fundamental swimming techniques, including kicking, arm movements, breathing, and coordination. However, empirical observations indicate that many students demonstrate low proficiency in these aspects [12], [13].

Several factors contribute to this problem. First, the limited variation in teaching methods reduces students' motivation and engagement during learning activities. Second, instructional practices often do not consider individual differences in students' abilities, leading to ineffective learning experiences. Third, the lack of structured and progressive learning models makes it difficult for students to develop motor skills systematically.

Furthermore, the learning environment and instructional strategies often fail to create an enjoyable and supportive atmosphere, which is crucial in swimming instruction. As a result, students tend to be passive, less confident, and less motivated to participate actively. This condition ultimately affects the achievement of learning objectives in physical education, particularly in swimming materials.

Therefore, addressing these issues requires the implementation of an effective learning model that emphasizes active participation, gradual skill development, and student-centered learning.

2 Methods

2.1 Research Design

This study employed a quantitative approach using a pre-experimental method with a *one-group pretest–posttest design* [14]. This design was used to measure the effectiveness of the basic swimming learning model by comparing students' motor skill performance before and after the intervention.

2.2 Participants

The participants of this study were 20 students selected using a *purposive sampling* technique. The selection criteria included students who had not yet mastered basic swimming skills and were actively participating in physical education classes. All participants were considered homogeneous in terms of learning background and age level.

2.3 Research Instruments

The instrument used in this study was a basic swimming motor skill test developed based on fundamental swimming techniques. The assessment consisted of four main components:

1. Kicking movement
2. Arm movement
3. Breathing technique
4. Movement coordination

Each component was evaluated using a scoring rubric with a scale ranging from 1 to 5, where higher scores indicated better performance. The instrument was reviewed for content validity by experts in physical education and tested for reliability prior to data collection.

2.4 Data Collection Procedure

The research procedure was conducted in three stages:

1. **Pretest**: Students' initial motor skills in basic swimming were measured before the treatment.
2. **Treatment**: Participants were given a basic swimming learning model through structured and progressive instructional sessions over a predetermined period. The learning model emphasized active participation, gradual skill development, and movement integration.

Posttest: After the treatment, students were reassessed using the same instrument to measure improvements in motor skills..

2.5 Data Analysis

Data were analyzed using descriptive and inferential statistics. Descriptive analysis was used to determine the mean and standard deviation of pretest and posttest scores. Inferential analysis was conducted using a *paired sample t-test* to examine whether there was a significant difference between pretest and posttest results.

The level of significance was set at $\alpha = 0.05$. Statistical analysis was performed using statistical software. If the significance value (Sig.) was less than 0.05 ($p < 0.05$), it indicated that the learning model had a significant effect on improving students' motor skills.

3 Results and Discussion

3.1 Result

Descriptive Statistics

The descriptive analysis indicates an improvement in students' basic swimming motor skills after the implementation of the learning model.

Table 1. Descriptive Statistics of Pretest and Posttest Scores

Test	N	Mean	Std. Deviation
Pretest	20	62.45	5.21
Posttest	20	78.30	4.87

As presented in Table 1, the mean score increased from 62.45 in the pretest to 78.30 in the posttest. This result suggests a noticeable improvement in students' basic swimming motor skills following the implementation of the instructional model.

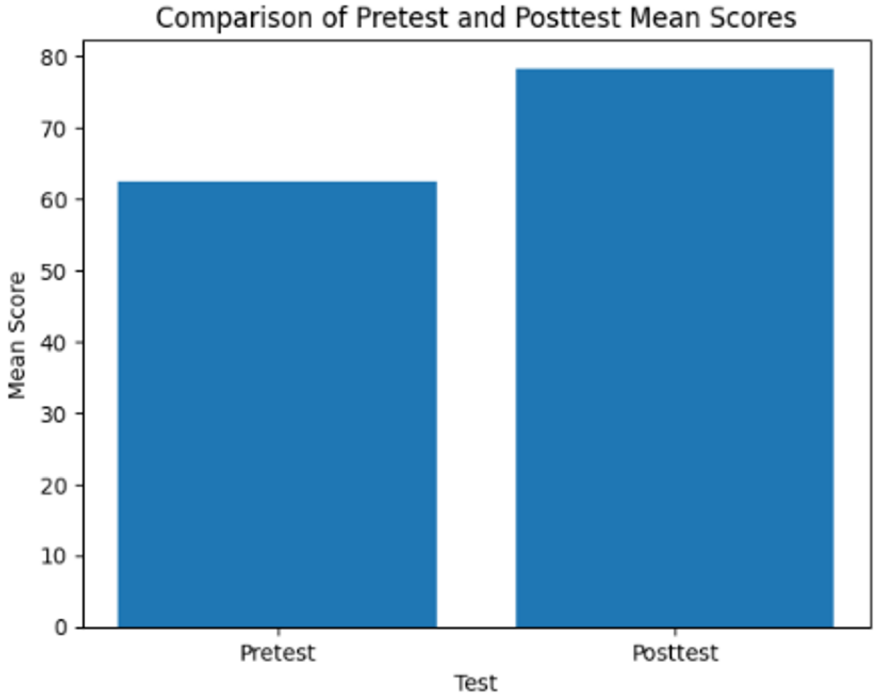

Fig 1. Grafik Comparison of Pretest and Posttest Mean Scores

The bar chart illustrates a comparison of the mean scores between the pretest and posttest of students' basic swimming motor skills. It can be observed that the mean score increased from 62.45 in the pretest to 78.30 in the posttest.

This improvement indicates a positive change following the implementation of the basic swimming learning model. The increase of 15.85 points suggests that the instructional intervention significantly enhanced students' performance. Visually, the bar chart shows a clear difference between the two conditions, with the posttest bar being noticeably higher than the pretest. This finding supports the statistical analysis, which confirms a significant improvement in students' motor skills. Therefore, the chart provides descriptive evidence that supports the study's findings, indicating that the basic swimming learning model is effective in improving students' learning outcomes, both quantitatively and visually.

Inferential Analysis (Paired Sample t-test)

To determine the significance of the increase, a paired sample t-test was conducted.

Table 2. Paired Sample t-test Results

Variable	Mean Difference	t-value	Sig. (2-tailed
Pretest-Posttest	-15.85	-8.76	0.000

The results show a t-value of -8.76 with a significance level of 0.000 ($p < 0.05$). This indicates a statistically significant difference between pretest and posttest scores. Therefore, it can be concluded that the applied learning model had a significant effect on improving students' motor skills.

Effect Size (Cohen's d)

To determine the magnitude of the effect, Cohen's d was calculated.

Table 3. Effect Size

Variable	Cohen's d	Interpretation
Pretest-Posttest	1.85	Large Effect

The effect size value of 1.85 indicates a large effect, suggesting that the learning model not only produced statistically significant results but also had a strong practical impact on students' motor skill improvement.

3.2 Discussion

The findings of this study demonstrate that the implementation of the basic swimming learning model significantly improved students' motor skills. This improvement is evidenced by the increase in mean scores as well as the results of the inferential

statistical analysis, which confirmed a significant difference between pretest and posttest outcomes.

From a theoretical perspective, this improvement can be explained through the application of a *student-centered learning approach*, which emphasizes active student engagement in the learning process. The structured learning model enabled students to develop their skills progressively, starting from fundamental movements to more complex coordination patterns. This is consistent with motor learning theory, which suggests that skill acquisition is optimized through systematic and repetitive practice.

Moreover, the integration of key swimming components kicking, arm movements, breathing, and coordination within a unified instructional framework provided a more meaningful learning experience. Students were not only trained in isolated techniques but were also able to understand and perform coordinated movements more effectively, leading to improved overall performance.

The large effect size ($d = 1.85$) further indicates that the implemented learning model had substantial practical significance. This finding highlights that the model is highly effective, even when applied in a relatively small sample group ($N = 20$). It also suggests that the instructional approach can be considered a viable alternative to conventional teaching methods, which are often less engaging and less effective.

These results are in line with previous studies indicating that innovative and student-centered approaches in physical education can enhance student motivation, participation, and learning outcomes. Therefore, the structured basic swimming learning model proposed in this study can serve as a practical solution to address the limitations of traditional instructional practices.

However, this study has several limitations. The relatively small sample size and the absence of a control group limit the generalizability of the findings. Future research is recommended to employ more rigorous experimental designs, such as *true experimental designs*, and to involve larger sample sizes in order to strengthen the validity and generalizability of the results..

4 Conclusion

This study concludes that the implementation of a structured basic swimming learning model is effective in significantly improving students' motor skills. This is evidenced by the increase in mean scores from pretest to posttest, supported by statistically significant results from the *paired sample t-test* ($p < 0.05$) and a large effect size (Cohen's $d = 1.85$), indicating strong practical impact.

The findings highlight that a student-centered and progressive instructional approach facilitates better motor skill acquisition, particularly in integrating fundamental swimming components such as kicking, arm movement, breathing, and coordination. Therefore, this learning model can serve as an effective alternative to conventional teaching methods in physical education.

Despite these promising results, the study is limited by its small sample size and pre-experimental design. Future research is recommended to employ more rigorous

experimental methods and larger samples to enhance the generalizability of the findings.

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