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The Use of Direct Visual Observation as a Means for Learning Leg Movements and Breathing in Butterfly Swimming

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Abstract

This study aimed to investigate the effect of using **direct visual observation** as an instructional aid in learning leg movements and breathing in the butterfly stroke among students of the College of Physical Education and Sports Sciences at the University of Wasit. The researcher adopted the experimental method using a single-group design with pre- and post-tests. The research sample consisted of (12) first-year students who were intentionally selected based on their ability to perform basic swimming skills.An instructional program based on direct visual observation was implemented over a period of (8) weeks, with two instructional units per week. The program relied on presenting sequential visual models (images and videos) using a data show projector, along with practical application in the swimming pool. Tests included measuring leg movement with breathing and evaluating butterfly stroke performance in terms of achievement and technical execution.The results showed statistically significant differences between pre- and post-tests in favor of the post-tests, indicating clear improvement in performance. This development is attributed to the effectiveness of direct visual observation in enhancing motor perception, facilitating understanding of skill components, improving coordination between leg movements and breathing, and increasing learners' motivation.
The study concluded that the use of direct visual observation as a teaching method is more effective than traditional approaches in learning swimming skills, particularly the butterfly stroke. The researcher recommended adopting this method in teaching swimming and other motor skills across different age groups.

Keywords: Direct visual observation, butterfly stroke, swimming education, motor learning, skill acquisition.

Introduction

Motor movements in swimming differ significantly from skill acquisition in other sports, primarily because they are performed in a completely different medium—water—rather than on land. Swimming is considered one of the most enjoyable and engaging sports worldwide, owing to its distinctive importance and the wide range of physical, health, psychological, and social benefits it provides.

In recent years, swimming has become an essential activity in both public and private life. Consequently, many countries have incorporated it into their educational curricula and have worked on developing instructional programs to adopt the most effective methods for teaching swimming skills. Swimming includes various styles, among which **butterfly stroke** is considered an advanced technique typically taught after mastering other strokes.

Freestyle swimming is also one of the most important Olympic swimming styles, ranking first in terms of speed and number of events. It refers to a swimmer's ability to complete a race distance using any preferred technique, except for the regulated strokes.

Instructional aids and their importance in motor learning are no longer considered marginal elements in the educational process; rather, they have become integral components. This is evidenced by their increasing use by teachers worldwide. The use of visual instructional aids enhances the effectiveness and positivity of motor learning, as they contribute to building and developing the learner's motor imagery and achieving a higher level of educational efficiency.

1.2 Research Problem

Through the researcher's experience as a swimming instructor at the College of Physical Education and Sports Sciences, it was observed that most students still face difficulties in learning the butterfly stroke when relying solely on live model demonstrations. Additionally, the speed of performance during skill demonstration negatively affects students' learning levels.

Moreover, demonstrating the skill in water often obstructs students' visibility, limiting their ability to clearly perceive movement details. Therefore, the researcher proposed introducing **direct visual observation** as an auxiliary instructional method in learning the butterfly stroke, particularly to facilitate the coordination between leg movements and breathing. This approach involves presenting a clear, sequential visual model of the skill, breaking it down into steps, and displaying it at a slower pace with emphasis on key technical points.

1.3 Research Objectives

The study aims to identify the following:

1. The effect of using direct visual observation as an auxiliary method in learning the butterfly stroke.
2. Learning the butterfly stroke using direct visual observation by improving coordination between leg movements and breathing.

1.4 Research Hypothesis

1. There are statistically significant differences between the pre-test and post-test results in learning the butterfly stroke using direct visual observation, in favor of the post-test results.

Research Scope

Human Domain:

First-year students at the College of Physical Education and Sports Sciences, University of Wasit.

Spatial Domain:

Al-Kut Indoor Swimming Pool (Al-Kafa'at).

Temporal Domain:

From 14/12/2025 to 21/2/2026.

Materials and Methods

Research Method

The researcher adopted the experimental method due to its suitability for the nature of the research problem.

Research Population and Sample

The research sample was intentionally selected from first-year students at the College of Physical Education and Sports Sciences, University of Wasit, for the academic year (2025–2026). A total of (12) students were selected, representing a group of learners proficient in basic swimming skills, in order to learn the advanced butterfly stroke. This sample constituted approximately (44%) of the total number of first-year students capable of swimming. The remaining students were excluded due to their inability to commit to the instructional units.

Equipment, Tools, and Data Collection Methods

Equipment Used

1. Laptop computer (1)
2. Data show projector (1)
3. Video cameras (2)
4. Electronic stopwatches (5)

Tools Used

1. Kickboards (compressed foam boards, Speedo type) (12)
2. Measuring tape (cm) (1)
3. Whistles (2)
4. Al-Kut Indoor Swimming Pool (Al-Kafa'at)

Data Collection Methods

1. Arabic and foreign references and internet sources
2. Personal interviews with experts and specialists
3. Data recording forms for pre- and post-tests
4. Assistant work team

Preparation of Illustrative Images and Videos

The researcher reviewed relevant Arabic and foreign literature and selected a set of images and instructional videos related to teaching the butterfly stroke. These materials were presented to a panel of swimming education experts, who approved most of them as valid and effective instructional models.

Notably, many of these materials featured highly skilled athletes, making them ideal representations of the target motor skill. The materials were organized progressively according to the stages of skill acquisition.

Additionally, a recorded video was segmented into partial sequences to facilitate learning, with emphasis on linking movements—particularly the coordination between leg movements and breathing. Supplementary visual enhancements were incorporated to improve clarity, organization, and learner motivation.

Tests

Leg Movement with Breathing Test

Objective

To measure the distance covered by the participant while performing leg movements combined with breathing.

Equipment

Swimming pool, kickboard, measuring tape.

Test Description

The participant stands in the pool with their back facing the pool wall, holding a kickboard with both hands and arms extended forward. One leg is extended with the foot on the floor, while the other leg is flexed at the knee with the foot against the pool wall. Upon the start signal, the participant bends the trunk, pushes off the wall with the flexed leg, glides forward, and performs leg movements with breathing.

Scoring

The distance is measured from the pool wall to the point where the participant stops and stands on their feet.

Butterfly Stroke Test

Objectives

1. To measure the distance covered during butterfly swimming.
2. To evaluate the technical performance of the participant.

Equipment

Swimming pool, measuring tape.

Test Description

The participant stands in the pool with their back facing the wall. One leg is extended while the other is flexed with the foot against the wall. Upon the start signal, the participant pushes off the wall and performs the butterfly stroke for the maximum possible distance using the best possible technique.

Scoring:

1. Performance (Distance): Measured from the wall to the stopping point.
2. Technical Evaluation: Assessed by three experts in swimming instruction, each assigning a score out of (10). The final score is the arithmetic mean of the three evaluations.

Pilot Study

A pilot study was conducted on (20/12/2025) prior to the pre-tests, involving (4) first-year students outside the main sample, selected randomly (with basic swimming ability). The pilot study aimed to:

1. Organize the instructional unit procedures, including timing and structure
2. Identify potential challenges and obstacles in implementing tests and the instructional program
3. Determine the suitability of the tests for the sample
4. Ensure the appropriateness of the testing environment
5. Estimate the time required for skill-based tests
6. Define the number and roles of the assistant work team

Pre-Tests

After completing the initial learning phase and achieving the floating stage, pre-tests were conducted on Thursday, (25/12/2025), at Al-Kut Indoor Swimming Pool (Al-Kafa'at), under the supervision of the researcher and with the assistance of the support team.

All testing conditions (time, location, equipment, procedures, and personnel) were standardized to ensure consistency with the post-tests.

Instructional Program

The instructional program was implemented over (8) weeks, starting from Saturday (27/12/2025) to Thursday (19/2/2026), at a rate of two instructional units per week. The researcher followed these steps:

- **Preparatory Section:**

  Included administrative organization, preparation of students and teaching aids, general warm-up followed by specific warm-up exercises relevant to the skill being taught.

- **Instructional Section (Visual Observation Phase)**

  Students were directed to a designated learning area equipped with a data show projector. They were seated to ensure clear visibility and effective listening. Instructional videos and exercises were presented sequentially, initially at a slow pace, with pauses at each segment. The instructor explained and repeated the exercises as needed to help learners form an initial motor representation. Practice on land was also included.

  Practical Application in Water

  Students entered the pool sequentially and performed the exercises in the shallow area facing the display. The instructor provided appropriate repetitions, feedback, and error correction.

- **Final Section:**

  Included recreational activities aimed at relaxation and returning students to a normal state, such as retrieving objects from the pool floor or passing games among peers.

Post-Tests

Post-tests were conducted on Sunday (22/2/2026) at Al-Kut Indoor Swimming Pool (Al-Kafa'at), following the completion of the instructional program. The same tests, procedures, and conditions used in the pre-tests were applied, under the supervision of the researcher and the assistant team.

Statistical Methods

The researcher used the Statistical Package for the Social Sciences (SPSS) to analyze the data and extract the research results.

Results

This section presents, analyzes, and discusses the research findings obtained after collecting data from the pre- and post-tests administered to the research sample.

Presentation and Analysis of Test Results

To identify differences between arithmetic means and standard deviations in the pre- and post-tests:

Presentation and Analysis of the Leg Movement with Breathing Test in Butterfly Swimming

Table 1. Results Of The Pre- And Post-Tests, Arithmetic Means, Standard Deviations Of Differences, Calculated T-Value, And Percentage Of Improvement For The Control And Experimental Groups In Performing Leg Movements With Breathing.

Group	Unit	Pre-Test Mean	± SD	Post-Test Mean	± SD	Mean Difference	SD of Difference	Calculated t-value	Tabulated t-value	Improvement %	Significance
Experimental	Meter	3.925	1.241	11.719	1.621	7.794	0.380	29.679	1.796	187.421	Significant

Significant at (0.05) with degrees of freedom (11).

Presentation and Analysis of Butterfly Stroke Skill Test (Performance Achievement)

Table 2. Results of pre- and post-tests, arithmetic means, standard deviations, calculated t-value, and percentage of improvement for the research sample in butterfly stroke performance (achievement).

Group	Unit	Pre-Test Mean	± SD	Post-Test Mean	± SD	Mean Difference	SD of Difference	Calculated t-value	Tabulated t-value	Improvement %	Significance
Control	Meter	2.884	1.651	9.467	1.284	6.583	0.371	47.211	1.796	159.549	Significant

Significant at (0.05) with degrees of freedom (11).

Presentation and Analysis of Swimming Skill Test (Technical Performance Evaluation)

Table 3. Results of pre- and post-tests, arithmetic means, standard deviations, calculated t-value, and percentage of improvement for both groups in technical performance evaluation.

Group	Unit	Pre-Test Mean	± SD	Post-Test Mean	± SD	Mean Difference	SD of Difference	Calculated t-value	Tabulated t-value	Improvement %	Significance
Control	Score	1.574	1.231	5.391	1.367	3.817	0.136	18.535	1.796	186.429	Significant

Significant at (0.05) with degrees of freedom (11).

Discussion

The results presented in Tables (1), (2), and (3) indicate a statistically significant improvement in learning the butterfly stroke for the research sample between the pre- and post-tests, in favor of the post-tests.

This improvement can be attributed to several factors, including the effective utilization of available resources in implementing the instructional program. Optimal use of facilities, equipment, tools, and allocated instructional time plays a critical role in achieving effective teaching outcomes. Furthermore, the suitability of the instructional curriculum to the learners' level and abilities contributed to this improvement.

The instructional program was designed based on a gradual progression from simple to complex tasks, which facilitated noticeable development in students' performance. The use of assistive tools (such as kickboards and peer assistance) helped reduce fear among learners and enabled the instructor to engage a larger number of students effectively. Such tools enhance learners' sense of safety and allow them to focus more on skill execution while providing the instructor with better control over the teaching process.

The role and competence of the instructor also played a vital part in motivating learners, encouraging persistence, and fostering a positive learning environment. Effective encouragement increases learners' engagement and willingness to participate in physical activities.

The findings also confirm the research hypothesis, demonstrating statistically significant differences between pre- and post-tests in favor of the post-tests. The use of direct visual observation as an instructional aid facilitated clearer visual presentation, enhancing comprehension and skill acquisition. When combined with auditory instruction provided by the teacher, this method proved highly effective. Visual stimuli, compared to auditory and kinesthetic inputs, are considered more effective in skill acquisition, as motor tasks benefit greatly from clear visual demonstrations and cues

Conclusions

1. The use of direct visual observation as an instructional aid in learning swimming skills yielded better results than traditional teaching methods used in colleges of physical education, as evidenced by the improvement rates.
2. The visual model used in teaching the butterfly stroke effectively demonstrated the skill and its components clearly and comprehensively in the water and from multiple angles, outperforming live demonstrations.
3. Direct visual observation enhanced learners' motivation toward self-learning through a cycle of (observe – perform – observe – correct – compare).
4. The use of a data show projector enabled clear and appropriately scaled presentation of the skill, comparable to real-life demonstrations.
5. Direct visual observation was distinguished by its ability to present images and videos in slow motion and segment the skill into parts, leading to improved coordination and accuracy in performance.

Recommendations

1. Employ direct visual observation as an instructional aid in teaching swimming across different age groups and for both genders.
2. Utilize direct visual observation in motor learning, particularly for teaching the butterfly stroke.
3. Apply direct visual observation in teaching skills beyond swimming.
4. Generalize the instructional program based on direct visual observation to colleges of physical education and sports sciences for use in swimming education.

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