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THE EFFECT OF PROPOSED TRAINING METHODS ON LEARNING FREESTYLE SWIMMING SKILLS IN NOVICE SWIMMERS

Влияние предложенных тренировочных методов на обучение навыкам плавания вольным стилем у начинающих пловцов

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Abstract:
This study investigates methods for teaching freestyle swimming skills to juniors aged 6-8 years using an experimental approach suitable for such research. The sample consisted of 45 children divided into three experimental groups. The researcher used physical tests to measure the fitness components and observation checklists to assess the technical performance of swimmers in freestyle swimming. The study ended with several results:

1. The best educational method used by the third experimental group, which taught the arm and leg movements at the same time, was the best method to teach freestyle swimming for beginners of 6-8 years old.
2. The second method was the method used by the second experimental group, which taught the leg movements before the arm movements.
3. The first experimental group, which taught arm movements first followed by leg movements, showed the weakest performance among the three groups.

Keywords: Training methods; Freestyle swimming; Juniors.

1. **Introduction**:

Swimming is a sport of special importance because of its physical, psychological, and social benefits. It holds a prominent position in global and Olympic competitions, as evidenced by the greater number of medals awarded than in other sports. The last few years have seen a growth of scientific interest in swimming, which has led to an increase in the number of publications and specialized books designed to apply research findings to training and teaching. Swimming is ideally taught at an early age, unlike other sports, since it utilizes the aquatic environment as a medium for movement through the coordination of arm and leg movements to enhance human efficiency. Freestyle swimming is the preferred style for beginner children aged 6-8, as it aligns with their motor development goals of efficiency, movement quality, ease of direction change, and motor response control.
Studying the learning process and the comprehensive development of individuals leads to an understanding of various teaching methods, including their development, nature, and requirements. There are several methods for teaching freestyle swimming, and this is evident in the relevant studies, including the one by Mohamed Abdel Rahman, which dealt with the

basic skills of freestyle swimming for children aged 6 to 8 years. Several educators and specialists, such as Abu Al-Ala Ahmed Abdel Fattah, have used the complete, partial, and mixed methods, but they did not address the best organization methods to achieve learning experiences with efficiency and speed.

The objective of this study was to teach the beginner swimmers through three strategies:

- Teaching the arm movements before the leg movements.
- Teaching leg movements before arm movements.
- Teaching arm and leg movements simultaneously.

This research is important for identifying the most effective method among the three approaches to teaching freestyle swimming, using supporting tools and aids, so that swimming instructors can select the best method to optimize learning time.

1-2 Problem Statement : By reviewing scientific literature and sources and communicating with coaches, the researcher has found various methods of teaching freestyle swimming to beginners. Some follow the method of teaching leg movements first, then arm movements, and then integrating with breathing. Others begin with arm movements before leg movements, also followed by linking with breathing. A third approach involves teaching arm and leg movements simultaneously and then integrating them with breathing. Due to the diversity of these teaching methods and the inability to determine the most effective method in terms of effort, time, and cost efficiency, the researcher deemed it necessary to investigate this issue to identify the optimal approach for teaching freestyle swimming to beginners.

1-3 Research Objective:

This study aims to determine which of the following methods is most effective for teaching freestyle swimming to beginners: teaching arm movements before leg movements, teaching leg movements before arm movements, or teaching arm and leg movements together.

1-4 Research Hypotheses:

- All methods of teaching freestyle swimming to beginners affect the learning process.
- The method of teaching arm and leg movements simultaneously is the most effective for teaching freestyle swimming to beginners.

2- **Theoretical Studies:**

2.1.Learning and teaching :

The terms "learning" and "teaching" are often confused as if they represent the same concept; however, each has a distinct meaning, although they complement each other since learning requires the presence of both teacher and learner.

Learning has been defined in various ways. For instance, Najah and Akram cited Singer (1980) defining learning as "the relatively permanent change in performance and behavior resulting from previous experience and practical application" (Najah Mahdi Shalash & Akram Mohammed Sobhi, 1994, p. 17).

It is also defined as "a process involving variables that occur during acquired experience to modify human behavior; it is the adaptation of responses to suit different situations, reflecting experience and compatibility with the environment" (Wajih Mahjoub and others, 2000, p. 4).

According to Kurt Meinel (1989), learning is “a directed activity aimed at acquiring and integrating knowledge and capability” (Kurt Meinel, translated by Abdul Ali Naseef, 1989, p. 170).

Teaching, however, is defined as “the specification and control of learning conditions under which the learner can learn independently, spontaneously, incidentally, or with assistance” (Mohammed Mahmoud Al-Khawaldeh and others 1997, p. 3).

It is also defined as “the process of transmitting and transferring information, knowledge, experience, and skills from teacher to learner through learning, where the teacher is a motivator, encourager, and guide” (Mohammed Saleh Al-Hayti, 1999, p. 9).

The distinction between learning and teaching can be summarized as follows (Najah Mahdi Shalash & Akram Sobhi, 2000, p. 18): Learning involves selecting, organizing, strengthening behavior, and measuring outcomes. Teaching revolves around facilitating learning and is performed by the teacher, coach, or educator through duties and guidance for students. Learning is an internal process of the student that involves selection, reinforcement, generalization, and discrimination, which leads to a change in behavior within the lesson. The activity of the teacher is external and observable, but the activity of the student is internal and invisible, but its results can be observed in the form of motor skill performance. Behavior is the basis for learning, and the ultimate result of learning is a change in behavior. For example, when learning a motor skill such as arm or leg strokes, learning begins with a detailed explanation and demonstration before the learner and repeated practice until correct performance, using various supporting methods and tools that include equipment, devices, and exercises.

2.2. Motor Learning:

Motor learning cannot be directly evaluated but rather indirectly through motor behaviour. It is worth noting that motor learning occurs as a result of training and repetition, not due to maturation or motivation. Many changes in motor behaviour appear as a result of the individual's development and maturation, so these changes cannot be considered part of motor learning. There is a relationship between learning and training, as both are subject to repetition. Training is the repetition of a specific task aimed at developing and improving physical and skill-related attributes, as well as the individual's physiological condition. On the other hand, learning is the repetition of a specific movement that leads to a change in behaviour and conduct. (Ahmed Amin Fouzi, 1980, pp. 41-42).

There have been multiple perspectives on defining the concept of motor learning. Singer (1980) defined it as "the learning that is linked to the organic and situational factors affecting the acquisition and performance of behaviour, which is generally reflected in movement." (Singer, 1980, P: 21)

As for Nizar (1983), he defined it as "the process through which the learner can form new motor abilities or modify their abilities through practice and experience" (Nizar Al-Talib, Kamel Louis, 1993, p. 37).

As for Wajih Mahjoub (1989), he defined it as learning movements or sports skills combined with the individual's ability and comprehension and based on previous experiences (Wajih Mahjoub, 1989, p. 17).

As for Mufti (1998), he defined motor learning as "the proficiency in sensory-motor skills resulting from the learner's effort, which leads to an improvement in their motor behaviour" (Mufti Ibrahim Hamad, 1998, p. 181).

Issam (1999) defined motor learning as "the process of acquiring, mastering, and stabilising sports skills during technical preparation, which requires the athlete's positive contribution to achieving the specified goals" (Issam Abdel Khalek, 1999, p. 208).

The purpose of measuring motor learning is to assess the individual's level and compare it with others, as outlined by Nabila Labib Mahmoud et al. (1992, p. 5).

- ✓ To assess the individual's level and compare it with others.
- ✓ This involves assessing the individual's performance and comparing it to that of others.
- ✓ Judging the individual's progress in the skill. Judging the individual's progress in the skill.
- ✓ Detecting errors and quickly addressing them. Detecting errors and quickly addressing them.
- ✓ Knowing the individual's progress, which increases their motivation to practise. An individual's awareness of the progress they have made increases their motivation to practice.
- ✓ Recognising the appropriateness of the skill for learning. Identifying the skill's suitability for learning.
- ✓ Evaluating both the learning method used and the programme set. Evaluation of both the learning method used and the programme set.
- ✓ It helps the teacher to effectively guide and control the learning process. It helps the teacher to effectively guide and control the learning process.

2-2- Factors Affecting the Process of Learning Motor Skills:

As is well known, there are many factors and variables that affect the educational situation. These factors and variables require recognition by both the teacher and the coach in order to control and manage their impacts. Many researchers have attempted to categorize these factors, but we have chosen to divide them into three sections (Najah Mahdi Shalash and Akram Sobhi, 2000, pp. 146-162).

2.2.1. Personal factors related to the learner's condition, the most prominent of which are :

- ❖ Age and gender.
- ❖ Previous experiences.
- ❖ Intelligence.
- ❖ Emotional maturity.
- ❖ General motor skills.
- ❖ The internal organs' fitness.
- ❖ Social level.

2.2.2. External factors and those specific to the learner's condition, which are:

- ❖ The training program and its various methods.
- ❖ Training tools, location, and time.
- ❖ The trainer and the social environment.

2.2.3. **Intermediate factors and variables:**

The goal of intermediate factors and variables is to identify processes that assume their existence and occurrence, which can be inferred from their effects and results in various situations. The most important of these factors are the following:

- Selection.
- Reinforcement.
- Design and differentiation.

The most important factors that must be present for the learning process to occur are outlined by Nagham Hatim Hamid (2000, p. 12).

- Forming connections between the situation and the reaction is essential to completing the learning process.
- Repetition helps in forming these connections.
- The discomfort and unease some movements cause regarding the incident can weaken the learner.
- Performing multiple responses before reaching the correct one that achieves the goal can weaken the learner.

2.2.4. **The necessity of having a stimulus that elicits a response is crucial. As for the activities that an individual learns, they have been divided into**:

- Skills and habits.
- Knowledge and information
- Social behavior.
- The individual's distinctive behavior.

3- THEORETICAL FRAMEWORK AND PREVIOUS STUDIES :

3.1. Objectives of Motor Learning :

The ambiguity surrounding the objectives of any given activity results in a waste of time and effort. The process of learning suffers considerably from such ambiguity. Defined and well-known learning objectives significantly enhance the efficient use of time and effort. Motor learning encompasses numerous clear objectives of considerable importance.

When a novice learner engages with any subject matter—whether practical or theoretical—the instructor, teacher, or coach must ensure the attainment of two primary objectives to convey to the learner:

1. An instructional objective.
2. An educational objective. (Abd Al-Rahman Adas & Muhyi Al-Din Tawfiq, 1995, p. 87)

1. The Instructional Objective :

This objective pertains to the transmission of subject matter content to the mind of the learner or novice — that is, equipping them with the available knowledge and information while diligently correcting errors from the outset in a focused manner, thereby enabling the learner to advance progressively toward higher levels of performance.

2. The Educational Objective :

This objective concerns the social application of the general concept underlying the lesson—specifically, the necessity of utilizing the lesson's conceptual content in practical everyday life. Consequently, the objectives of motor learning play a significant role in identifying the needs of society. These objectives yield considerable benefits, given that learning is a developmental

process; as such, they assist in understanding the problems related to the advancement of the individual toward optimal performance.

3.2. Characteristics of Early Childhood in Motor Learning :

The first three years of primary schooling represent a period of critical importance in the child's life, as they bring about significant changes in physical growth and motor development. Due to the prominent characteristics and attributes of this stage, children at this age require an expanded opportunity to interact with their new environment — in this case, the aquatic environment of the swimming pool.

Since water constitutes an environment to which the child is not accustomed, it is preferable not to compel the child to enter the water; rather, the child should be gradually acclimatized by allowing them to splash water and engage in play and recreational activities in the shallow end. The educational and cognitive capacities of the child may also be stimulated through the learning of motor skills required for the processes of learning and adaptation.

In this regard, Kurt Meinel affirms, "The rapid growth of motor learning capacity is one of the distinctive characteristics of the first stage of a child's entry into school, and this increase is particularly evident in the second grade and especially in the third grade." (Osama Kamel Rateb & Mohamed Ali Zaki, 1989, p. 250).

These characteristics are defined as follows:

- Physical growth.
- Motor development.

4- The Importance of Teaching Freestyle Swimming in Early Childhood:

We must regard children's physical activity during this developmental stage with the utmost seriousness, given its fundamental importance in shaping their future lives. Children must therefore be provided, throughout their growth period, with ample opportunities for physical activity, as well as general freedom of movement and play.

The activity of swimming is considered one of the natural activities suited to children's energy and vitality, and it simultaneously serves as a means of self-regulation, helping to develop strong, well-formed, and agile bodies. Through the acquisition of swimming and its various associated activities, learners are equipped with a life-saving skill. An individual who is competent in swimming is capable of saving themselves from drowning and can likewise rescue others. It is therefore advantageous to introduce swimming instruction to children from an early age, given their superior capacity for learning compared to adults. (Mustafa Kadhim et al., 1982, p. 9).

Children in the age range of 6 to 8 years are capable of learning and working within groups, provided that such groups are homogeneous and consistent with the learners' readiness and abilities. Learners at this developmental stage require a sense of security, confidence, and reassurance with respect to the individual responsible for instruction. (Osama Kamel Rateb & Mohamed Ali Zaki, 1989, p. 61).

5- Instructional Methods Used in Teaching Freestyle Swimming to Beginners

The learning process is defined as the totality of knowledge, information, ideas, habits, and motor or non-motor skills acquired by the learner, regardless of whether the learning process

occurs intentionally or incidentally. Numerous approaches and methods have emerged for the learning process, differing according to the learner's age, capabilities, gender, available resources, ambient temperature, and instructional time. (Mahmoud Hassan et al., 1999, p. 67). There are several learning methods, namely the Whole Method, the Part Method, and the Mixed Method. Studies, research, and scholarly opinions differ regarding the most effective and efficient approach for teaching freestyle swimming to beginners. Some advocate the whole method, others favor the part method, and still others prefer the mixed method. The selection, as previously noted, depends on the learner's age, capabilities, gender, and related factors.

5.1. Stages of Learning :

Teaching swimming through the correct approach requires the learner to follow the subsequent instructional stages (Ali Al-Bik et al., 1998, p. 31).

Stage 1: Water Familiarization and Elimination of Fear :

This stage constitutes the first phase of the learning process and represents the sound foundation for success in the instructional process. It aims to foster self-confidence in young learners and to eliminate the fear factor that may arise from the child's entry into an unfamiliar medium—and the consequent loss of balance while walking, resulting from the upward buoyant force exerted by water on the child's body—as well as the relative pressure of water on the child's chest and the attendant unusual breathing conditions.

The entry of water into the eyes intensifies this discomfort. Accordingly, the instructor must endeavor to employ educational strategies that enable the child to successfully navigate this stage. This goal may be accomplished through the use of group games both inside and outside the water, thereby enabling the child to enter the water without experiencing the aforementioned phenomena, as the child's attention is redirected. (Mahmoud Hassan et al., 1999, p. 58).

Stage 2: Correct Breathing and Opening the Eyes Underwater :

(Osama Kamel Rateb & Mohamed Ali Zaki, 1989, p. 119).

Students commonly experience difficulty when learning the skill of breathing and opening their eyes underwater, as water enters the nasal passage during exhalation. Instructing the student to exhale before submerging their face in the water can help overcome this problem. During the initial phases of performing this exercise, students tend to remove water from their faces in a tense or jerky manner, which increases the coach's responsibility in persuading students to discontinue this behavior as exercise performance progresses.

Stage 3: Buoyancy (Flotation)

Any person is capable of floating in water provided the body assumes the correct position to facilitate this. Children float more easily than adults because their relative density is lower than both adults' and water's.

The sensation of buoyancy and the adoption of correct body positions constitute the foundation for the subsequent acquisition of technical skills. It should be noted that females are able to float more easily than males, as the proportion of body fat is relatively higher in females, particularly in the thigh and pelvic regions. However, this advantage with respect to buoyancy simultaneously constitutes a factor impeding balance in the water, especially when adopting a vertical position while standing or walking on the pool floor.

Stage 4: Gliding

This stage refers to the child's ability to penetrate the water by pushing off the wall or the pool floor while assuming a streamlined, fusiform body position that minimizes water resistance. The sensation of the ability to glide is one of the most important factors contributing to confidence in one's capacity to learn swimming, as the child feels, upon completing this stage, that they are capable of moving through the water.

Stage 5: Learning Preliminary Diving Entries (Water Entry by Diving)

During the initial stages of learning and prior to the acquisition of fundamental swimming strokes, the learning of certain diving entries is considered a complementary necessity in acclimatizing with the aquatic environment and represents an advanced phase of fear-factor elimination. This is typically accomplished through feet-first entry in a relatively shallow section of the pool, at which point the learner progresses to a deeper level of self-confidence. Entry into the water and remaining beneath the surface for a period following the dive greatly assists the learner in developing kinesthetic awareness of the body and its various segments underwater.

If the learner is already in the water during this stage, this task is particularly easy for the child, especially during the initial lessons. Diving entries must progress systematically to ensure that the head does not strike the pool floor at any point; head-first dives begin from a seated or prone position on the pool deck.

5.2. Recommended Equipment for Use During Swimming Instruction

First: Equipment Worn by the Child

- Life rings / buoyancy rings.
- Inflatable plastic arm floats.
- Compressed foam arm floats.
- Leg floats (fins).
- Buoyancy vest (life jacket).

Second: Equipment Used During Instruction

- Kickboards of various shapes.
- Colored plastic balls of various sizes.
- Colored pebbles / sinkers.

5.3. Technical Execution in Freestyle Swimming :

Freestyle swimming is performed in a horizontal position (prone), with the trunk and legs fully extended near the water surface, the shoulders positioned slightly above the level of the hips, and the face fully submerged such that the waterline is at the level of the forehead (hairline). The arm stroke in freestyle swimming is executed through two phases: one above the water (recovery phase) and one below the water surface (entry, catch, pull, and push phases). The arm strokes are performed with regularity and continuity — without interruption at any phase of execution, either inside or outside the water. Simultaneously, leg kicks are performed continuously and alternately in upward and downward directions without cessation. Breathing is performed at the conclusion of one arm's underwater cycle (either right or left) by rotating the head laterally toward the side of that arm, thus allowing the mouth to reach above the water surface for inhalation. Upon completion of the inhalation, the head is rapidly rotated

back inward without neck tension, with the gaze directed toward the hand at the moment the arm enters the water, and exhalation is performed. (Ali Al-Bik et al., 1998, p. 59).

5.3.1. Technical Execution of Leg Kicks in Freestyle Swimming :
The leg movement initiates with a downward press of the thigh against the water; because of the thigh's movement, the lower leg and foot are mobilized with a slight flexion at the knee joint, enabling the foot to execute the whip-like kick.
• At the end of the downward kick, the thigh reaches its lowest point and then begins to accelerate upward with the leg fully extended.
As one leg begins to execute the whip-like kick, the opposite leg moves upward in a fully extended position. (Ali Al-Bik et al., 1998, p. 69).
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5.3.2 Technical Execution of Arm Strokes in Freestyle Swimming :
(Ali Al-Bik et al., 1998, p. 71).
1. Arm Movement Underwater Entry: The arm enters the water in front of the shoulder with the fingertips and palm facing downward, then the wrist, then the elbow; the arm then extends forward and slightly downward in preparation for the catch. Catch: Following the entry of the hand into the water and the forward extension of the arm, the elbow is slightly flexed and the wrist is bent inward to increase control in gripping the water in preparation for the pull phase.
Pull: The water is pulled by flexing the elbow joint so that the palm follows a curved path beneath the body's longitudinal midline until the elbow angle is 90°. It is noted that in the pull phase the elbow is higher than the palm and pointing away from the body, while the palm is always oriented backward—in the opposite direction to the swimmer's course. Push: The elbow joint is extended to push the water vigorously backward, the palm facing backward, until the arm is fully extended along the thigh. Arm Movement Above the Water (Recovery Phase) The arm's recovery phase above the water begins with the elbow being lifted out of the water upward, followed by the forearm and wrist (with the palm facing backward). Then the elbow is rotated a quarter turn inward in a pendular motion, such that it remains above the level of the palm.
3. Coordination of Arm Strokes :
The two arms operate alternately, inside and outside the water: when one arm performs its underwater movement, the other arm performs its recovery movement above the water, as follows:

- ✓ When one arm begins to exit the water, the opposite arm begins the catch phase.
- ✓ When one arm executes the pull phase, the opposite arm moves above the water in preparation for entry.
- ✓ When one arm completes the pull phase and prepares for the push, the opposite arm enters the water.

5.3.3 Breathing :
Breathing is executed by coordinating the rhythm between the head and one of the arms (right or left), achieved by rotating the head laterally toward the side of that arm to allow the mouth to reach above the water surface for inhalation. As the arm enters the water, the head's rotational

movement inward is completed for the purpose of exhalation. At the end of the arm's underwater cycle (during the push phase), the head starts rotating laterally, and inhalation continues until the arm exits the water; during the arm's recovery phase above the water, the head rotates inward until the arm enters the water and exhalation is performed. The following phases illustrate the coordination between the movements of both arms, the head, and the legs in freestyle swimming (Ali Al-Bik et al., 1998, pp. 60–65).

The left arm prepares to exit the water by flexing the elbow joint (elbow directed upward, palm backward), while the right arm enters the water and begins the catch phase, preparing for the pull; exhalation is performed with the gaze directed slightly forward and downward. The legs alternate continuously in upward and downward movements without interruption.

4. The right arm initiates the pull phase by flexing the elbow joint (elbow out, not down) so that the palm passes under the longitudinal midline of the body, while the left arm continues with recovery above the water.

5. The right arm completes the pull phase and prepares to push the water, while the left arm enters the water at shoulder width. The leg kicks continue to alternate in continuous upward and downward movements without interruption.

6. The left arm extends in the water, while the right arm's palm pushes by extending the elbow joint until the palm faces backward, preparing to exit the water; the head begins to rotate laterally as the mouth emerges above the water surface for inhalation. Leg kicks alternate continuously in upward and downward movements without interruption.

7. The right arm exits the water with the elbow directed upward, while the left arm begins the catch phase and prepares for the pull; inhalation continues. Leg kicks alternate continuously in upward and downward movements without interruption.

The pull phase begins with the left arm flexing at the elbow joint (elbow directed laterally), while the right arm recovers above the water and the head rotates inward after inhalation. The leg kicks are continuous in an alternating up and down movement without interruption.

9. The left arm completes the pull phase and prepares to push the water, while the right arm completes its recovery above the water and prepares to enter ; exhalation begins as the face is submerged. Leg kicks alternate continuously in upward and downward movements without interruption.

10. A new arm cycle commences above and below the water : the right arm extends in the water and begins the catch phase, while the left arm completes the push phase and prepares to exit the water ; the gaze is directed slightly forward and downward. (Osama Kamel Rateb & Mohamed Ali Zaki, 1989, p. 58).

6- RESEARCH METHODOLOGY AND FIELD PROCEDURES

6.1 Scope of Research :

6.1.1 Scope of Human : A sample of 45 children who have never practiced swimming.

6.1.2 Temporal Scope :From 25 May 2025 to 25 July 2025.

6.1.3 Spatial Scope :The semi-Olympic swimming pool in the Province of Oum El Bouaghi.

6.2. Research Methodology :

The adoption of an appropriate research methodology suited to investigating a given problem is contingent upon the nature and type of the problem in question. Therefore, the researcher

used the experimental method with an equivalent – groups design including scientific controls as this approach is appropriate to address the research problem and its objectives. The experimental method is the most valid method to solve effectively and theoretically many scientific problems. It contributes to the advancement of scientific research in the human and social sciences, including the science of sport. (Mohamed Hassan Alawi & Osama Kamel Rateb, 1999, p. 3).

6.3.Study Population and Sample : The process of sample selection is closely related to the nature of the population from which the sample is selected, as the sample is "the part that represents the original population, or the model on the basis of which the researcher undertakes the entirety of his work." (Wajih Mahjoub, 2001, p. 163).

The research sample was therefore selected from the pupils of Al-Ma'amel Primary School for Boys in the Province of Al-Qadisiyyah, within the age bracket of 6 to 8 years, using the purposive sampling method. The total sample comprised 45 children. Employing the systematic random method, the researcher divided the sample into three experimental groups, each consisting of 15 pupils, given that all sample members belonged to the same developmental stage, shared the same environmental background, and had neither learned nor previously practiced swimming—a factor of considerable importance and influence in scientific research methodology. The groups were organized as follows:

Experimental Group 1 :

This group was instructed in arm stroke movements first, followed by leg kick movements, after which these movements were integrated into the breathing process.

Experimental Group 2 :

This group was instructed in leg kick movements first, followed by arm stroke movements, after which these movements were integrated into the breathing process.

Experimental Group 3 :

This group was instructed in arm stroke and leg kick movements simultaneously, after which these movements were integrated into the breathing process.

The researcher ensured that the sample met the following criteria:

• No prior experience in swimming.
• Demonstrated willingness to learn swimming.
• Verified medical fitness.

6.4 Research Instruments, Tools, and Equipment :

Instruments are defined as "the means or method by which the researcher is able to resolve their research problem, regardless of the nature of those instruments—whether data, samples, equipment, or otherwise." (Wajih Mahjoub, 1988, p. 133). Accordingly, the researcher utilized the following instruments and tools:

• Reference sources and bibliographic materials.
• Personal interviews.
• Research assistance team.
• Metric measuring tape for height measurement.
• Motor skills performance evaluation form.
• Buoyancy vests — 20 units.

• Kickboards for leg kicks — 20 units.
• Inflatable plastic arm floats — 20 units.
• Whistle.
• Semi-Olympic swimming pool.

6.5 .**Tests and Measurements :**

Used in the Study The weight and the height were measured on Wednesday, May 25, 2025. The four physical fitness tests were held on Wednesday, May 28, 2025.

Weight Measurement :

Children's body weight was measured using a medical scale, with subjects wearing only their swimming shorts to standardize measurement conditions.

Height Measurement :

Height was measured using a metric tape fixed to a vertical wall. The subject stood at the designated position wearing only their swimming shorts and barefoot in an upright posture with the gaze directed forward; a flat ruler was placed on the crown of the head to indicate the height in meters and fractions thereof.

Explosive Leg Power Test :

(Mohamed Sobhi Hassanein, 1994, p. 163).

Purpose: To measure explosive power of the muscles responsible for knee extension.

Material: Measuring tape, playing area c. 20-25 meters.

Test Description: The subject stands behind a line marked on the ground; at the start signal the subject performs a triple jump (hop, step, jump). The distance is recorded in meters and fractions thereof from the last contact point. Two attempts are permitted with appropriate rest intervals; the best attempt is recorded.

Explosive Arm Power Test: Forward Support Position

(Mohamed Hassan Alawi & Mohamed Nasser Al-Din Ridwan, 1984, pp. 143–144).

Push-ups — continuous arm flexion and extension for 10 seconds.

Purpose: To measure explosive power of arm muscles Equipment: Electronic stopwatch and a helper to count the repetitions during the test Description: The subject lies on the floor in a push-up position with the body fully extended. On the signal, the subject performs full arm flexion and extension continuously for the maximum number of repetitions, without stopping, in a period of 10 seconds Conditions: • No interruptions are allowed.
• The body must remain straight throughout the entire performance.
• The chest must touch the floor at the bottom of each repetition.
• Note full arm flexion and extension.

Scoring: The score is the number of repetitions performed correctly within the 10-second period.

20-Meter Sprint Test — Flying Start

(Qais Naji & Bastawi Ahmed, 1987, p. 373).

Purpose: To measure locomotor speed.

Equipment: Measuring tape; chalk; whistle; 2 stopwatches.

Test Description: Three lines are drawn parallel to each other on the earth. The distance between line 1 and line 2 is 10 m and the distance between line 2 and line 3 is 20 m. The subject stands behind the first starting line in a high-start position and, upon the signal, runs at maximum speed until reaching Line 2, then continues to Line 3.

Scoring: The elapsed time from Line 2 to Line 3 is recorded in seconds and fractions thereof. Two attempts are permitted with a standard rest interval; the best attempt is recorded.

Shuttle Run Test — 5 × 5 Meters

(Ali Saloum Jawad Al-Hakim, 2004, p. 107).

Purpose: To measure cardiorespiratory endurance Equipment Needed: 2 cones/flags; stopwatch test Description: The subject assumes a high-start position facing the first flag, behind the starting line (Line A). On the word go, the subject runs to the other flag, circles it, and returns to the starting line, where the subject circles the first flag and continues. The subject runs between the two lines for five repetitions. The finishing times for the 5th and final repetition are recorded at the finish line (Line B). Scoring: Time elapsed in seconds to run the distance back and forth five times.

6.7 Pilot Study (Exploratory Experiment): The pilot study is considered one of the most important procedural requirements in research work, defined as "a practical rehearsal for the researcher to personally identify the shortcomings and merits encountered during the administration of tests in order to prevent their recurrence in the future." (Qasim Hassan Al-Mandalawi et al., 1989, p. 107). Tuesday 31st May 2025 between 08.00 and 09.00 a.m. was the time the researcher pilot study was conducted. on a sample of 9 children outside the main research sample to obtain valid and reliable results. The aim of the pilot study was the following:

- To find out the time needed for the delivery of the instructional method.
- Evaluate the suitability of the instruments and equipment used.
- Identify and rectify errors that may occur during the main experiment.
- Verify the suitability of the venue designated for the main experiment.

Familiarize the research assistance team with the procedures and protocols.

The pilot study was conducted eight days prior to the commencement of the main experiment, under identical conditions and at the same venue used for the main research procedures.

6.8 Instructional Curriculum : After a detailed study of the existing instructional curricula in swimming reference sources, which contributed to the researcher's knowledge of the duration of instructional units and their subdivisions, the researcher, under the supervision of the academic advisor, designed a special instructional curriculum for each of the three experimental groups.

The instructional curriculum was then reviewed by experts and specialists in the field of swimming. The instructional curriculum consisted of a period of six weeks, with four instructional units per week, for a total of 24 instructional units throughout the entire program. Each instructional unit had a duration of 60 minutes, divided as follows: • Preparatory section: 10 minutes.

• Core part = 45 min • Final part = 5 min

Group 1 starts at 8:00 h. to 9:00 a.m. and Group 2 will meet from 9:15 to 10:15 a.m. Training started Sunday, June 8, 2025. Group 3, 10:30-11:30 a.m. Wajih Mahjoub quoting Pavlov says, "The body is best prepared for muscular and mental activity in the first half of the day with peak activity between 8:00 a.m. and 12:00 noon and again between 2:00 and 5:00 p.m." (Wajih Mahjoub, 1985, p. 23). The instructional curriculum was teaching basic freestyle swimming skills for all three groups during the first two weeks (Weeks 1 and 2) with 8 instructional units per group. The curriculum consisted of the following basic skills:

- Familiarization with water and fear-factor elimination.
- Learning the correct breathing technique and how to open your eyes underwater.
- Buoyancy (flotation).
- Gliding.
- Preliminary diving entries (water entry by diving).
- Stroke instruction (leg kicks and arm strokes).

6.9. The specific instructional approaches for each group were as follows:

Experimental Group 1 : Arm stroke movements were taught with the legs immobilized using a specialized leg-support aid for a period of one week (4 instructional units) during Week 3. Subsequently, the arms were immobilized using a specialized arm-support aid, and leg kick movements were taught during Week 4 (4 instructional units). In Week 5, the arm strokes, leg kicks, and breathing were integrated (4 instructional units) with the use of a buoyancy vest (life jacket). In Week 6 (last week) after the removal of the buoyancy vest, the three movement components (arm strokes, leg kicks, and breathing) were integrated in a fluid and coordinated manner (4 instructional units).

Experimental Group 2 : Leg kick movements were taught with the arms immobilized using a specialized arm-support aid for one week (4 instructional units) during Week 3. Subsequently, the legs were immobilized using a specialized support aid, and arm stroke movements were taught during Week 4 (4 instructional units). In Week 5, the arm strokes, leg kicks, and breathing were integrated (4 instructional units) using a buoyancy vest (life jacket). In Week 6 (the final week), the three movement components were combined in a fluid and coordinated manner (4 instructional units) following the removal of the buoyancy vest.

Experimental Group 3 : This group was instructed using a buoyancy aid secured around the chest — specifically, a buoyancy vest designed for ages 6 to 12 years. This group practiced simultaneous arm and leg movements for two weeks (Weeks 3 and 4), completing 8 instructional units. In Week 5, the breathing skill was combined with simultaneous arm and leg movements (4 instructional units). In Week 6, the researcher removed the buoyancy vest from the group, and the students performed the freestyle swimming skill by integrating leg kicks, arm strokes, and breathing in a fluid and coordinated manner (4 instructional units).

Post-Test (Summative Assessment) The researcher administered the post-test for the motor performance of all three experimental groups for the event of freestyle swimming over a distance of 25 meters on Thursday, July 24, 2025. This assessment was carried out using the evaluation form for motor performance, whereby an appropriate score was assigned to each component of the swimming stroke: arm strokes received a maximum of 5 points, leg kicks

received a maximum of 3 points, and breathing received a maximum of 4 points. Overall coordination was assessed at a maximum of 3 points, bringing the total final score for all components of the freestyle swimming movement to 15 points.

6.10 Statistical Methods : The researcher employed the following statistical methods: arithmetic mean, standard deviation, and F-test (variance analysis) (Wadea Yassin Al-Tikriti & Hassan Mohamed Al-Ubeidi, 1999, pp. 102, 155, 290).

- Arithmetic mean .
- Standard deviation
- F-test (variance analysis).
- Least Significant Difference test (LSD). (Mohamed Jasim Al-Yasiri & Marwan Abd Al-Majid, 2000, p. 280).
- Pearson product-moment correlation coefficient. (Mohamed Hassan Alawi & Mohamed Nasser Al-Din Ridwan, 1987, p. 113).

7- **PRESENTATION, ANALYSIS, AND DISCUSSION OF RESULTS**:

This chapter presents, analyzes, and discusses the results of the post-test measurements for the research sample through statistical tables, which illustrate the differences between the research groups to identify which of the three groups showed the most effective learning outcomes in freestyle swimming for beginners.

7.1 Presentation of results :

7.1.1 Arithmetic mean and standard deviation of motor performance in freestyle swimming in the three experimental groups

Table 01 presents the arithmetic mean and standard deviation of motor performance in freestyle swimming across the three experimental groups.

No.	Group	Arithmetic Mean	Standard Deviation
1	Group 1	7.2	2.80
2	Group 2	8.6	1.92
3	Group 3	10.8	0.91

Table (01) presents the arithmetic means and standard deviations for motor performance in freestyle swimming among the experimental groups.

The arithmetic mean for Group 1 was 7.2 with a standard deviation of 2.80. Group 2 achieved an arithmetic mean of 8.6 with a standard deviation of 1.92. Group 3 achieved an arithmetic mean of 10.86 with a standard deviation of 0.91.

7.1.2 Analysis of Variance for Post-Test Motor Performance Assessment :

Source of Variance	Sum of Squares	df	Mean Square	F.Calculated	F.Critical	Sig.Level	Significance
Between Groups	102.71	2	51.35	12.41	5.15	0.01	Significant
Within Groups	173.73	42	41.13				

Table (02): F Calculated and Critical Values for the Three Experimental Groups — Motor Performance in Freestyle Swimming

Table (02) shows that the calculated F value is 12.41, while the critical (tabulated) F value is 5.15 at the significance level of 0.01. The fact that the calculated value is higher than the critical value indicates that there are statistically significant differences between the three groups, according to the respective instructional methods used.
Because the calculated F value is higher than the critical F value, the researcher had to calculate the Least Significant Difference (LSD) by using the LSD test to identify the group with the most effective learning outcomes according to the instructional method used in each group, as shown in Table 03.

Groups Compared	Arithmetic Means	Mean Difference	LSD Value	Significance
G1 vs G2	7.2 — 8.6	1.40	2.009	Not Significant
G1 vs G3	7.2 — 10.86	3.66	2.009	Significant
G2 vs G3	8.6 — 10.86	2.66	2.009	Significant

Table (03): LSD Post-Hoc Comparison Results Between the Three Groups — Motor Performance in Freestyle Swimming

Table (03) shows the calculated LSD value of 2.009 at a significance level of 0.01. The table further reveals the existence of statistically significant differences between Group 1 and Group 3, in favor of Group 3, which employed the instructional approach of moving the arms and legs simultaneously.
Statistically significant differences were also found between Group 2 and Group 3, in favor of Group 3. The difference between Group 1 and Group 2 was less than the LSD value, indicating that this difference is attributable to random variation; however, a comparison of arithmetic means reveals that Group 2 achieved higher performance than Group 1.

8. Discussion of Results:

From the analysis of Table (03) we observe that there are statistically significant differences between the three research groups in the results of the motor performance assessment for swimming freestyle, and these differences favor group (3). When an athlete performs any athletic movement or exercise, multiple muscle groups are involved, each with a distinct functional role, while the nervous system coordinates and controls all these groups to produce the highest possible level of muscular force. The nervous system coordinates these muscle groups to produce the required force at the appropriate times according to the requirements of skilled performance. (Abu Al-Ila Ahmed Abd Al-Fattah, 1997, p. 117).

Teaching freestyle swimming through the simultaneous movement of the arms and legs, followed by the integration of these movements with the breathing process—the approach employed by Group 3—requires precisely this type of coordination between muscle groups to achieve the highest level of performance and speed in learning. In other words, teaching freestyle swimming as a whole is better than teaching it in parts. This conclusion is confirmed by the internationally recognized expert James Counsilman, who states, "Teaching by the whole method for beginners is superior to the part method, because part-method learning does not serve the skill as a whole." (Osama Kamel Rateb, 1999, p. 31).

Cecil Colvin similarly concurs with this perspective, arguing that partial learning of freestyle swimming does not necessarily lead to correct overall performance and that the whole method is the most effective approach in the domain of swimming instruction. Niemyer's study likewise demonstrated that learning by the whole method is superior to learning by the part method in terms of both performance level and speed of acquisition. (Osama Kamel Rateb, 1999, p. 31).

Regarding Group 2, which learned freestyle swimming through leg kicks first, followed by arm strokes and then breathing, it was found that this group did acquire freestyle swimming skills, but in an incomplete and uncoordinated manner. The reason for these results is attributable to the nature of leg kick movements: when leg kicks are taught in isolation, the movement is vertical (up and down); however, during the actual integrated performance of swimming, the movement is executed at a diagonal angle due to the body's rotation about its longitudinal axis. Consequently, excessive partial practice of leg kicks means teaching the learner leg movements that differ from the actual performance of full freestyle swimming.

The researcher also observed in Group 2 that the children tended to move slightly backward rather than forward. Upon reviewing the relevant literature, it was found that when leg kick movements are performed without arm movements in freestyle swimming, children tend to move backward rather than forward — a directional discrepancy attributable to the position of the feet relative to the legs. It is therefore essential that the feet maintain a position relative to the leg that can be modified throughout the range of motion. (Risan Khribit Majid & Najah Mahdi, 2002, p. 289).

Regarding Group 1, which learned freestyle swimming by practicing arm strokes first followed by leg kicks and then breathing, it was found that this group acquired freestyle swimming skills but in a deficient and inadequate manner. The reason for this is attributed to the fact that when the group learned arm strokes, the hand was pulling forcefully at the water surface and

continuing in that direction until it reached alongside the body. The downward force generated during the first part of this movement raises the upper body, while if this force occurs at the end of the arm movement, the push is directed upward and causes the body to sink. Since this push occurs in a region adjacent to the body's center of gravity, it will contribute to body submersion and increased water resistance, thus wasting time and energy. (Risan Khribit Majid & Najah Mahdi, 2002, p. 290).

9. Conclusions :

The researcher was able to draw the following conclusions from the study findings and within the scope of the research sample and the statistical analyses of results:

1. The instructional approach used by Experimental Group 3 – teaching simultaneous arm and leg movements – is the most effective of the three instructional methods for teaching freestyle swimming to beginners aged 6 to 8 years.
2. The instructional approach used by Experimental Group 2 – teaching leg movements first, then arm movements – is ranked second among the three methods for teaching freestyle swimming to beginners aged 6 to 8 years.
3. The least effective method of teaching freestyle swimming to beginners aged 6 to 8 years was that of Group 1, which teaches the arm movements first and then the leg movements.

10. Recommendations: Within the limits of the research sample and study procedures, and in light of the findings obtained, the researcher recommends the following:

1. Prioritising the instructional method based on teaching the arm and leg movements simultaneously for teaching freestyle swimming to the 6-to-8 age group.
2. Use the method of teaching the leg movements first, then the arm movements as a secondary method for teaching the freestyle swimming to the age group of 6 to 8 years.
3. Conduct similar research studies for different age groups and various swimming styles.
4. A similar study with a longer instructional curriculum to test the long-term learning outcomes of the three instructional methods.

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