

## Impact of Proposed Training Methods on Learning Freestyle Swimming Skills among Young Swimmers

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### Abstract:

This study explored the methods of teaching freestyle swimming skills to young novices aged 6-8 years. The experimental design of the study was meticulously crafted to accommodate the distinct learning capabilities of this age group. A cohort of 45 participants was distributed across three experimental groups to ensure a robust comparative analysis. Physical evaluations were conducted to ascertain the participants' fitness levels, while technical proficiency in freestyle swimming was gauged using a specially designed observation card. The findings of this study are multifaceted, revealing that:

1. The synchronous arm and leg teaching approach employed by the third experimental group emerged as the most efficacious method for this age group.
2. The sequential teaching of leg movements followed by arm movements, as practiced by the second group, was the second most effective method.
3. The approach of teaching arm movements prior to leg movements, utilized by the first group, proved to be the least effective.

**Keywords:** Training Methods, Freestyle Swimming, Young Swimmers.

### 1. Introduction:

Swimming occupies a distinguished position within the realm of sports, celebrated not only for its physical, psychological, and social benefits but also for its prominent status in international and Olympic competitions, which award more medals in swimming than in any other sport. The surge in scientific inquiries into swimming over recent years is mirrored by an increased publication of research studies and specialized texts that aim to harness these academic insights for practical training and pedagogical advancements.

Unlike other sports, teaching swimming at an early age is uniquely challenging due to the aquatic environment, which requires a refined coordination of arm and leg movements to optimize human aquatic efficiency.

Freestyle swimming is particularly suited for beginners, especially those between the ages of 6 to 8, as it aligns with their developmental trajectory towards more goal-directed, economical, and qualitatively improved movements. This style facilitates not only directional changes but also the refinement of motor responses. Insights into developmental psychology and pedagogical methods illuminate various instructional strategies and their historical evolution, enriching our understanding of their characteristics, necessities, and categorical distinctions.

Extant literature on freestyle swimming instructional methods includes works by scholars such as Muhammad Abdel Rahman, who has concentrated on the foundational freestyle techniques appropriate for children within this specific age bracket. Other pedagogues, like Abu Al-Ala Ahmed Abdel Fattah, have investigated holistic, partial, and mixed methods, though their research stops short of organizing these pedagogical experiences to optimize learning trajectories. This study, therefore, seeks to fill this gap by evaluating three distinct teaching methodologies:

- A. Initiating with arm movements before transitioning to leg movements.
- B. Prioritizing leg movements followed by arm movements.
- C. Integrating arm and leg movements concurrently.

The objective is to ascertain which method most effectively aids instructors in optimizing the instructional duration necessary for teaching beginners, thereby enhancing the overall efficacy of the learning process.

### **1-2 Research Problem:**

Upon reviewing the scientific literature and engaging with coaching professionals, it became apparent that a variety of instructional methods exist for teaching freestyle swimming to novices. These methods range from those that emphasize leg movements before arm movements, integrating breathing techniques thereafter, to others that reverse this sequence, as well as approaches that teach arm and leg movements simultaneously prior to introducing breathing techniques.

Given the diversity of these pedagogical approaches and the inherent challenges in evaluating their effectiveness in terms of effort, time, and cost efficiency, this study was initiated to determine the optimal teaching method for facilitating the learning of freestyle swimming among beginners.

### **1-3 Research Objective:**

This study is dedicated to discerning the most effective method for teaching freestyle swimming to beginners. The specific pedagogical strategies under scrutiny are: teaching arm movements

before leg movements, teaching leg movements before arm movements, and teaching arm and leg movements concurrently.

#### **1-4 Research Hypotheses:**

1. All identified methods of teaching freestyle swimming significantly influence the learning outcomes for beginners.
2. The method involving simultaneous instruction in arm and leg movements is hypothesized to be the most effective in teaching freestyle swimming to beginners.

### **2. Theoretical and Related Studies**

#### **2-1 Theoretical Studies**

##### **2-1-1 Learning and Teaching:**

Although often used interchangeably, the terms 'learning' and 'teaching' hold distinct meanings, each playing a complementary role in the educational process. Learning is defined by scholars such as Nijad and Akram, quoting Singer (1980), as "the product or reflection resulting from a relatively permanent change in performance and behavior due to past experiences and practical application" (Nijad Mehdi Shalish, Akram Mohammed Sobhi, 1994, p. 17).

It is further described as a process during which variables that modify human behavior are set in motion, adapting responses to different situations and aligning them with environmental demands (Wajih Mahjoub et al., 2000, p. 4).

Kurt Meinel (1989) articulates learning as an activity aimed at acquiring and integrating knowledge and capabilities (translated by Abdul Ali Nasif, 1989, p. 170). In contrast, teaching is defined as the orchestration of the learning environment by the educator, enabling autonomous, spontaneous, and collaborative learning experiences (Mohammad Mahmoud Al-Khawalda et al., 1997, p. 3).

It involves the transfer and transformation of information, knowledge, skills, and experiences from the teacher to the learner, facilitated by the educator's roles as a motivator, encourager, and guide (Mohammad Saleh Al-Heeti, 1999, p. 9).

The dichotomy between learning and teaching can be illustrated as follows: Learning centers on the learner's activities, such as selecting, organizing, reinforcing behavior, and measuring outcomes, which lead to behavioral changes. Teaching, conversely, focuses on the activities performed by the teacher, trainer, or educator, which are more visible and externally directed. However, the learner's activities, though internal and less observable, culminate in skilled motor performance, which stands as the ultimate indicator and result of the educational process (Nijad Mehdi Shalish and Akram Sobhi, 2000, p. 18).

##### **2-1-2 Motor Learning:**

Motor learning is an intriguing area of study, primarily because it cannot be directly observed but is inferred from changes in motor behavior. It is critical to understand that motor learning stems from training and repetitive practice, and is not merely a result of maturation or motivational factors. Many behavioral changes that occur as a person develops and matures should not be confused with motor learning.

The connection between learning and training is pronounced, as both involve repetition: training consists of repeated exercises aimed at enhancing physical skills and physiological conditions, while learning is the repetition of movements that ultimately modify behaviors and actions (Ahmad Amin Fawzy, 1980, pp. 41-42).

The concept of motor learning is viewed from multiple perspectives. According to Singer (1980), motor learning is associated with organic and situational factors that influence the acquisition and performance of behaviors, typically manifested through movement (Singer, 1980, p. 21). Nizar (1983) describes it as the process by which a learner acquires new motor skills or modifies existing ones through practice and experience (Nizar Talib, Kamel Louis, 1993, p. 37). Wajih Mahjoub (1989) sees it as the acquisition of movement or sports skills that are augmented by the individual's ability and understanding, relying heavily on past experiences (Wajih Mahjoub, 1989, p. 17).

Mofti (1998) speaks of it as mastering a sensory-motor skill through the learner's efforts, which leads to enhanced motor behavior (Mofti Ibrahim Hammad, 1998, p. 181). Essam (1999) defines it as the process of acquiring, mastering, and stabilizing sports skills during technical training, necessitating the athlete's active involvement to achieve specific objectives (Essam Abdel Khalek, 1999, p. 208).

The purposes of measuring motor learning are multifaceted (Nabila Labib Mahmoud et al., 1992, p. 5):

1. Assessing an individual's level and comparing it with peers.
2. Evaluating an individual's progression in a particular skill.
3. Identifying and swiftly correcting errors.
4. Gauging an individual's progress to boost their motivation for practice.
5. Determining the appropriateness of a skill for learning.
6. Evaluating the effectiveness of the teaching method and the designed program.
7. Aiding the teacher in effectively guiding and managing the learning process.

### **2-1-3 Factors Affecting the Motor Skill Learning Process:**

It is well acknowledged that numerous factors and variables influence the educational environment. Recognition and management of these factors by both teachers and coaches are

essential for controlling their impact on the learning process. While researchers have categorized these factors extensively, here we delineate them into three main sections (Nijad Mehdi Shalish and Akram Sobhi, 2000, pp. 146-162):

**1. Personal factors related to the learner's condition:**

- Age and gender.
- Previous experiences.
- Intelligence.
- Emotional maturity.
- General motor abilities.
- Internal physical fitness.
- Social level.

**2. External factors related to the learner's condition:**

1. The training program and its various methods.
2. Training tools, location, and timing.
3. The coach and the social environment.

**3. Intermediate factors and variables:**

The purpose of mediating factors and variables is to acknowledge processes that are presumed to exist and occur, which can be inferred from their effects and outcomes in various situations. The most important of these factors include:

- Selection.
- Reinforcement.
- Design and Discrimination.

The essential factors required for the learning process to occur are (Nagham Hatem Hamid, 2000, p. 12):

- Establishing connections between the situation and the response to complete the learning process.
- Repetition aids in the formation of these connections.
- The factor of discomfort and unease caused by certain movements can weaken the learner.

- Engaging in multiple responses before achieving the correct response that accomplishes the goal.
- The necessity of stimulation that elicits the response.

The activities that individuals learn have been categorized into:

- Skills and habits.
- Knowledge, information, and meanings.
- Social behavior.
- Behavior characteristic of the individual.

#### **2-1-4 Objectives of Motor Learning: (Abdul Rahman Adas, Mohey El Din Tawfik, 1995, p. 87):**

As noted by Abdul Rahman Adas and Mohey El Din Tawfik (1995, p. 87), clarity in the objectives of any learning activity is crucial to prevent wastefulness of time and effort, as ambiguity often hampers the learning process. Well-defined objectives significantly enhance the efficiency of both time and effort in educational settings. In motor learning, these objectives are particularly critical and can be categorized into two primary types:

1. An educational objective.
2. A pedagogical objective.

##### **1. Educational Objective:**

This involves the accurate transmission of subject content to learners, equipping them with the necessary information, and rigorously correcting misconceptions from the outset to foster progression towards higher learning achievements.

##### **2. Pedagogical Objective:**

This aims at applying the general concepts learned in a social context, meaning that what is learned should have practical applicability in everyday life. Thus, the objectives of motor learning are profoundly influential in understanding societal needs and contribute substantially to the developmental process. They are instrumental in addressing and improving issues related to an individual's progression and societal integration.

#### **2-1-5 Characteristics of Early Age Stage in Motor Learning:**

The formative years at primary school—specifically the first three—are pivotal for children, marked by rapid physical growth and substantial motor development. During this phase, children require extensive opportunities to engage with their surroundings, here exemplified by water.

Instead of abrupt immersion, a gentle introduction that allows them to splash, play, and explore in shallow waters is advocated.

This approach not only accommodates their comfort but also enhances their educational and cognitive growth in acquiring essential motor skills. As highlighted by Kurt Meidl, "the rapid development of motor learning capabilities is a distinctive feature of a child's early school years, particularly noticeable in second and especially in third grade" (Osama Kamel Rateb, Mohammed Ali Zaki, 1989, p. 250). The defining attributes of this stage include:

- **A:** Physical growth
- **B:** Motor development

### **2-1-6 Importance of Teaching Freestyle Swimming at an Early Age:**

The myriad activities in which children partake during these early years are crucial for their developmental trajectory. An active lifestyle with ample physical activity and the liberty to move and play is essential. Swimming aligns perfectly with the energetic disposition of children and also serves as a vehicle for self-regulation, aiding in the development of robust, graceful, and nimble physiques.

Mastery of swimming provides significant lifesaving skills, enabling individuals to rescue themselves and others from drowning situations. Consequently, initiating swimming lessons at a young age is advisable, given the heightened openness of children to new learning experiences compared to adults (Mustafa Kazem et al., 1982, p. 9).

At ages 6 to 8, children are adept at learning in group settings, which should be structured to reflect their developmental readiness and capabilities. It is imperative that learners in this group feel secure, confident, and supported by their instructors (Osama Kamel Rateb, Mohammed Ali Zaki, 1989, p. 61).

### **2-1-7 Methods Used in Teaching Freestyle Swimming to Beginners:**

The learning process encompasses the acquisition of knowledge, information, ideas, and skills, spanning both motor and cognitive domains, and can occur intentionally or accidentally. Various instructional methodologies have evolved, tailored to the learner's age, abilities, gender, and the resources available, as well as environmental conditions and timing.

Among these, holistic, partial, and mixed methods are prominent. Educational research offers diverse perspectives on the most effective and efficient methods for instructing beginners in freestyle swimming. Preferences among these methods may vary, often influenced by factors such as the learner's age, capabilities, and gender (Mahmoud Hassan et al., 1999, p. 67).

### **2-1-8 Learning Stages:**

Properly learning to swim involves a structured progression through defined educational stages (Ali Al-Bayk et al., 1998, p. 31):

### **1. Acclimatization to Water and Overcoming Fear:**

This initial stage is crucial as it lays the groundwork for building self-confidence in young learners and mitigating the fear associated with entering an unfamiliar aquatic environment. Children often experience fear due to their inability to control their balance, as buoyancy forces their bodies upward, compounded by the pressure of water on their chests and the resulting unusual breathing patterns.

Discomfort from water in the eyes is also a common concern that needs addressing. Instructors are advised to utilize pedagogical techniques that ease these initial discomforts, such as engaging children in group games both in and adjacent to the water, effectively shifting their focus away from these sensations (Mahmoud Hassan et al., 1999, p. 58).

### **2. Proper Breathing and Eye Opening:**

Mastering the skills of proper breathing and opening eyes underwater can be challenging for students, particularly as water tends to enter the nose during exhalation. Instructors should guide students to exhale before submerging their faces. In the early phases of learning, there is a natural tendency among students to wipe water from their faces, which can create tension. Instructors must work diligently to help students refrain from such instinctive behaviors, guiding their progression in this skill (Osama Kamel Rateb, Mohammed Ali Zaki, 1989, p. 119).

### **3. Floating:**

Floating is facilitated by adopting an appropriate body posture that enhances buoyancy. Children, owing to their generally lower body density relative to adults, find it easier to float. Understanding and maintaining the right floating positions are crucial for developing further swimming skills.

It is noteworthy that females often find it easier to float due to their relatively higher fat content, particularly around the thighs and pelvis; however, this same anatomical feature may complicate balance, especially when attempting to stand or walk on the pool floor.

### **4. Gliding:**

Gliding is an activity where the child learns to traverse the water smoothly, starting with a push off from the wall or pool floor, and adopting a streamlined, spindle-shaped posture to minimize resistance. Achieving proficiency in gliding significantly boosts a child's confidence in their swimming capabilities, instilling a sense of empowerment as they navigate through water.

### **5. Learning Basic Dives (Entry into Water by Diving):**

Early on, before acquiring proficiency in basic swimming strokes, it is essential for learners to be introduced to basic diving techniques. This not only aids in acclimatizing them to the water but also advances their ability to conquer fears. Initially, diving is taught feet-first into a relatively shallow section of the pool to build confidence.

Further immersion helps learners experience and recognize the sensations of different body parts under water. Dives should be incrementally adjusted to always prevent head-first impacts with the pool bottom, starting from safer, less challenging positions such as sitting or lying on the pool edge.

### **2-1-9 Proposed Tools for Use During the Learning Process in Swimming:**

#### **Firstly, Tools Worn by the Child:**

- Life rings.
- Arm floats made of inflatable plastic.
- Arm bands made of compressed foam.
- Leg floats and fin attachments.
- Swim vests (buoyancy aids).

#### **Secondly, Tools Used During Learning:**

- Floating boards of various shapes.
- Colored plastic balls of different sizes.
- Colored pebbles.

### **2-1-10 Technical Performance in Freestyle Swimming**(Ali Al-Bayk et al., 1998, p. 59):

In freestyle swimming, the swimmer maintains a prone horizontal position with the trunk and legs extended near the water's surface. The shoulders are positioned slightly above the level of the pelvis, and the face is submerged, aligning the water's surface just above the forehead at the hairline.

The arm movements in freestyle are categorized into two primary phases: the aerial phase and the underwater phase. These phases include gliding, catching, pulling, and pushing actions performed in a fluid, uninterrupted cycle, whether the arms are moving through air or water. Simultaneously, the leg kicks are executed continuously and alternately, propelling the swimmer without cessation.

Breathing is synchronized with the strokes; as one arm completes its cycle underwater—either on the right or left—the head turns laterally towards the active arm to breathe. The mouth clears the

water briefly for inhalation, after which the head is promptly rotated back, minimizing neck strain and maintaining focus on the hand as it re-enters the water to exhale.

**2-1-10-1 Technical Performance of Leg Kicks in Freestyle Swimming** (Ali Al-Bayk et al., 1998, p. 69):

The leg kick in freestyle swimming initiates with a downward pressure applied by the thigh, followed by a whip-like motion from the leg and foot, articulating at the knee joint. This sequence is marked by:

- The concluding motion of the kick where the foot strikes the water, driving the thigh to its lowest position before it swiftly ascends with the leg fully extended,
- As one foot initiates the whip-like motion, the corresponding leg extends upward, preparing for its own kick.

**2-1-10-2 Technical Performance of Arm Strokes in Freestyle Swimming** (Ali Al-Bayk et al., 1998, p. 71):

**1. Arm movement inside the water:**

- **Entry:** The arm enters the water fingertips-first directly in front of the shoulder, followed sequentially by the wrist and elbow. This initial movement extends the arm slightly forward and downward, positioning it optimally for the subsequent catch phase.
- **Catch:** Following entry, as the hand and arm extend forward, the elbow bends subtly and the wrist twists inward to enhance control over the water, setting the stage for the pulling phase.
- **Pull:** The arm pulls the water by further bending the elbow, creating a curved path beneath the body's midline. This movement continues until the elbow forms a 90-degree angle. Throughout this phase, the elbow remains elevated above the hand, which is oriented sideways, consistently pointing backward against the direction of swimming.
- **Push:** The pushing phase involves a forceful extension of the elbow, directing the hand backward until the arm is fully extended alongside the thigh. This motion propels the swimmer forward, utilizing the resistance of the water to maximize thrust.

**2. Arm movement outside the water:**

As the swimmer's arm transitions from underwater strokes to surface recovery, the elbow leads by lifting out of the water first, followed by the forearm and wrist, with the hand pointed backward. The elbow then rotates inward in a pendulum-like motion, ensuring it remains elevated above the hand level. This coordinated movement facilitates a smooth entry for the next stroke.

**3. Sequence of Arm Movements:**

The arms operate in a synchronized, alternate fashion, creating a continuous rhythm essential for efficient freestyle swimming:

- As one arm begins to exit the water, the other initiates the catch phase underwater.
- While one arm undergoes the pull phase beneath the water, the counterpart progresses through its recovery phase above the surface, preparing for re-entry.
- As the pulling arm transitions to the pushing phase inside the water, the recovering arm makes its entry, maintaining the swim's momentum.

**2-1-10-3 Breathing:** (Osama Kamel Rateb, Mohammed Ali Zaki, 1989, p. 58):

Breathing technique in freestyle is meticulously timed to coordinate with arm strokes and head movement. The swimmer turns their head laterally towards the arm that is actively stroking in the water to inhale as that arm begins to exit the water. This allows the mouth to clear the water surface efficiently.

The head stops turning inward as the same arm re-enters the water, marking the transition to exhalation. The cycle of turning the head to the side begins at the end of the arm's underwater push, continuing until the arm exits the water, while the opposite arm enters and the cycle of exhaling commences.

These stages outline the coordination between the movements of the arms, head, and legs in freestyle swimming (Ali Al-Bayk et al., 1998, pp. 60-65):

1. The left arm prepares to exit the water by bending the elbow (elbow pointing up and hand backward) while the right arm enters the water, beginning the catch phase with the hand and preparing for the pull with exhalation and eyes directed slightly forward and downward. The legs alternate kicks up and down without stopping.
2. The right arm begins the pull by bending the elbow (elbow pointing to the side, not downward) so the hand moves below the body's midline, while the left arm continues its motion outside the water. The leg kicks continue alternating up and down without stopping.
3. The right arm finishes pulling and prepares for the push, while the left arm enters the water shoulder-width apart. Leg kicks continue alternating up and down without stopping.
4. The left arm extends underwater while the right arm's hand pushes with the elbow extended until it points backward, preparing to exit the water. The head turns to the side as the mouth clears the water surface for inhalation. Leg kicks continue alternating up and down without stopping.

5. The right arm exits the water with the elbow pointing up while the left arm starts the catch and prepares for the pull, continuing inhalation. Leg kicks continue alternating up and down without stopping.
6. The left arm begins pulling by bending the elbow (elbow pointing to the side) while the right arm moves outside the water and the head starts turning inward after finishing breathing. Leg kicks continue alternating up and down without stopping.
7. The left arm finishes pulling and prepares for pushing while the right arm finishes its motion outside the water and prepares to enter, starting exhalation with the face in the water. Leg kicks continue alternating up and down without stopping.
8. A new cycle begins for both arms inside and outside the water as the right arm extends in the water and begins the catch while the left arm finishes pushing and prepares to exit the water, directing the gaze forward and downward.

### **Research Areas:**

#### **1-5-1 Human Domain:**

The study engaged a cohort of forty-five children who had no prior experience in swimming, providing a unique insight into the learning dynamics of novices.

#### **1-5-2 Temporal Domain:**

The research was conducted over a two-month period, specifically from May 25, 2015, to July 25, 2015, offering a concentrated snapshot of the learning progress within this timeframe.

#### **1-5-3 Spatial Domain:**

The study took place in the semi-Olympic swimming pool located in Oum El Bouaghi state, providing a controlled environment conducive to systematic observation and data collection.

### **3. Research Methodology and Field Procedures**

#### **3-1 Research Methodology:**

Considering the specific requirements of the study, the experimental method with controlled equivalent groups was employed. This approach is recognized as one of the most effective for addressing theoretical and practical scientific issues, promoting significant advancements in the humanities and social sciences, including the field of sports science (Mohamed Hassan Allawi, Osama Kamel Rateb, 1999, p. 217).

#### **3-2 Research Population and Sample:**

The sample selection was intricately linked to the specific characteristics of the population base. It consisted of forty-five boys aged 6-8 years from Al-Maamal Elementary School for Boys, Qadisiya Province. The purposive sampling method ensured that all participants shared the same

developmental stage and environmental background, had no prior swimming experience, and possessed a willingness to learn, factors that are critical for the integrity of the research methodology. The children were organized into three experimental groups:

- **First Experimental Group:** This group focused on learning arm strokes initially, followed by leg kicks, and culminating with the integration of these movements with breathing techniques.
- **Second Experimental Group:** This group began with leg kicks, progressed to arm strokes, and finally integrated these skills with breathing.
- **Third Experimental Group:** This group was taught both arm and leg strokes simultaneously and then moved on to combine these skills with breathing techniques.

Additional criteria ensured that all participants:

- Had no previous swimming experience.
- Expressed a desire to learn swimming.
- Were medically cleared for participation.

### **3-3 Tools, Means, and Equipment Used in the Research:**

The selection of tools and resources is crucial for addressing the research problem effectively.

The following tools and means were employed:

- Literature and references.
- Personal interviews.
- Support team.
- A metric tape for measuring height.
- Skill performance evaluation form.
- Twenty (20) buoyancy vests.
- Twenty (20) leg kickboards.
- Twenty (20) inflatable plastic arm bands.
- A whistle.
- The semi-Olympic pool.

### **3-4 Tests and Measurements Used in the Research:**

On Wednesday, May 25, 2015, baseline measurements of weight and height were conducted to ensure the standardization and accuracy of physical data collection. Subsequently, the primary tests were carried out on Saturday, May 28, 2015, as follows:

- **Weight Measurement:** Using a medical scale, children's weights were accurately measured. Each child, dressed in swim shorts only to ensure uniformity, was weighed, which facilitated the standardized assessment of their physical health and readiness for swimming activities.
- **Height Measurement:** Heights were measured against a tape fixed to a vertical wall. The children, attired in swim shorts and barefoot, stood straight with their gaze forward. A flat ruler was then placed on top of their heads, and height was recorded in meters and decimals thereof, providing a precise physical profile of each participant.
- **Test for Specific Strength Speed of Legs** (Mohammed Sobhi Hassanein, 1994, p. 163):
  - \_ **Purpose of the Test:** This test aimed to assess the specific strength and speed of leg muscles, particularly those involved in knee extension, critical for swimming strokes.
  - \_ **Tools Used:** A tape measure and a marked athletic field area spanning 20-25 meters were employed.
  - \_ **Test Description:** Participants began behind a designated line and, upon a start signal, performed a sequence comprising a hop, a step, and a jump—known as a triple jump.
  - \_ **Recording:** The resulting distance from the final mark of the testee was measured in meters and decimals to ensure accuracy.
  - \_ **Procedure:** Each child was allowed two attempts, with a suitable rest interval between them. The best of the two attempts was recorded for analysis.

#### **Arm Strength Speed Test:**

- **Test for Specific Arm Strength Speed** (Mohammed Hassan Allawi, Mohammed Nasreddin Ridwan, 1984, p.143-144).
- **Purpose of the Test:** To measure the specific strength speed of the arm muscles.
- **Tools:** Stopwatch, a partner to count repetitions.
- **Test Description:** The testee assumes a front support position on the ground with the body in a straight line. At the start signal, the testee bends and fully extends their arms continuously, aiming for the maximum number of repetitions possible within 10 seconds.
- **Conditions:**
  - No stopping allowed.
  - The body of the testee must remain straight during the performance.

- The chest must touch the ground during the performance.
- Full bending and extending of the arms must be observed.
- **Recording:** The score is the number of correct repetitions completed within 10 seconds.

### **20m Flying Start Sprint Test:**

- **Purpose of the Test:** To measure transitional speed.
- **Tools:** Measuring tape (chalk, whistle, two stopwatches).
- **Performance Description:** Three parallel lines are drawn on the ground. The distance between the first and second line is 10m, and between the second and third line is 20m. The testee starts behind the first line. At the high start signal, the testee sprints as fast as possible, reaching maximum speed by the second line and finishing at the third line.
- **Recording:** The time taken from the start at the second line to crossing the finish line is recorded in seconds and fractions.
- **Two attempts are allowed after standard rest, with the best attempt being recorded.**

### **5x55m Shuttle Run Test:**

- **Purpose of the Test:** To measure respiratory endurance.
- **Tools:** Two flags, a stopwatch.
- **Performance Description:** The testee stands ready in front of the first flag, behind the start line (Line A) in a high start position. At the start signal, the testee runs towards the second flag, circles it, and returns to the start line, circling the first flag, and continues this back and forth for a total of five laps, ending at the finish line (Line B).
- **Scoring:** The time taken to complete the five laps between the two lines is recorded in seconds.

### **3-7 Pilot Study:**

A pilot study is crucial in practice as it allows the researcher to identify potential negatives and positives encountered during test execution to avoid them in the future (Kasim Hassan Al-Mandlawi et al., 1989, p.107). To ensure accurate results, the researcher conducted the pilot study on a Tuesday, October 31, 2023, between 8 and 9 AM with a sample of nine children, outside of the research sample. This pilot study aimed to:

- Determine the time required to administer the teaching method.
- Assess the suitability of the equipment and tools used.
- Avoid potential errors in the main experiment.

- Ensure the suitability of the venue for the main experiment.
- Familiarize the support team with the nature of the work. The pilot study was conducted eight days before the start of the main project under the same conditions and at the same location where the research procedures were applied.

### **3-8 Educational Curriculum:**

Through reviewing the educational curricula found in the literature on swimming, the researcher, under the guidance of the supervisor, developed an educational curriculum for each of the three experimental groups, which was then presented to experts and specialists in the field of swimming. The curriculum spans six weeks, with four instructional units per week, totaling 24 units overall. Each instructional unit lasts 60 minutes, divided into three parts:

- **Preparatory Section (10 minutes)**
- **Main Section (45 minutes)**
- **Concluding Section (5 minutes)**

The sessions began on Wednesday, June 8, 2015, with the following schedule:

- **First Group:** 8:00 – 9:00 AM
- **Second Group:** 9:15 – 10:15 AM
- **Third Group:** 10:30 – 11:30 AM

Wajih Mahjoub references Pavlov's observation that the body is most prepared for physical and mental activity in the first half of the day, particularly from 8 AM to 12 PM, and from 2 PM to 5 PM (Wajih Mahjoub, 1985, p. 23).

The curriculum for the first two weeks, covering eight instructional units per group, focuses on teaching the following basic skills:

- **Acclimatization to Water and Overcoming Fear**
- **Proper Breathing and Opening Eyes**
- **Floating**
- **Gliding**
- **Teaching Basic Dives**
- **Stroke Techniques**

The teaching methods for each group were as follows:

### **A - First Experimental Group:**

In the third week, this group was taught arm strokes with their legs fixed using a special leg-support device, across four (4) instructional units. In the fourth week, the group's arms were stabilized using a special arm-support device, and leg strokes were taught over another four (4) instructional units. In the fifth week, the arm strokes, leg strokes, and breathing were integrated using a buoyancy vest (life jacket), over four (4) instructional units. In the sixth and final week, the three movements (arm strokes, leg strokes, and breathing) were seamlessly integrated in four (4) instructional units after removing the buoyancy vest.

### **B - Second Experimental Group:**

This group was taught leg strokes in the third week with their arms fixed using a special arm-support device, across four (4) instructional units. In the fourth week, the legs were stabilized with a special device and arm strokes were taught, also in four (4) instructional units. In the fifth week, arm strokes, leg strokes, and breathing were integrated using a buoyancy vest, across four (4) instructional units. In the sixth and final week, the three movements were seamlessly combined in four (4) instructional units after the removal of the buoyancy vest.

### **C - Third Experimental Group:**

This group was taught using a special buoyancy device suitable for children aged 6-12 years. The arms and legs were moved together for two weeks, in the third and fourth weeks, over eight (8) instructional units. In the fifth week, the breathing technique was added to the movement of the arms and legs, in four (4) instructional units. In the sixth week, the researcher removed the buoyancy vest, and the group performed freestyle swimming by integrating leg and arm strokes with breathing, in a fluid manner over four (4) instructional units.

### **3-9 Post-Experimental Assessment:**

The researcher assessed the skill performance of the three experimental groups through a freestyle swimming activity over a distance of 25 meters, conducted on Sunday, July 24, 2015. The performance evaluation form awarded points for each swimming movement, with arm strokes receiving five (5) points, leg strokes three (3) points, and breathing four (4) points. The overall coordination received three (3) points, making the total score for the freestyle swimming skill fifteen (15) points.

### **3-10 Statistical Methods Used:**

Statistical analysis was carried out using various tools as referenced in the work of Wadi Yasin Al-Tikriti and Hassan Mohammed Al-Obaidi (1999, pp. 102, 155, 290), ensuring the rigorous evaluation of data gathered during the study.

1. Mean (Arithmetic Average).
2. Standard Deviation.

3. Analysis of Variance (F-test).
4. Least Significant Difference (L.S.D.) (Mohammed Jasim Al-Yasiri, Marwan Abdel Majid, 2000, p. 280).
5. Pearson's Simple Correlation (Mohammed Hassan Allawi, Mohammed Nasreddin Radwan, 1987, p. 113).

#### 4. Presentation, Analysis, and Discussion of Results

This chapter includes a presentation, analysis, and discussion of the post-test results for the research sample through statistical tables, which show the differences between the research groups to determine which of the three groups is better in the process of teaching freestyle swimming to beginners.

##### 4.1 Presentation of Results:

4.1.1 Display of the arithmetic means and standard deviations for the freestyle swimming skill performance of the three experimental groups as shown in Table (01).

**Table (01): Skill Performance in Freestyle Swimming**

Number	Group	Mean	Standard Deviation
1	First Group	7.2	2.80
2	Second Group	8.6	1.92
3	Third Group	10.8	0.91

Table (01) clearly illustrates that the Third Group not only achieved the highest mean performance score (10.8) but also the lowest standard deviation (0.91). This denotes the most consistent and effective learning outcomes among the groups, suggesting a superior mastery of freestyle swimming skills.

##### 4-1-2 Presentation and Analysis of Variance Results for Evaluating Skill Performance in Freestyle Swimming

**Table (02): Analysis of Variance for Skill Performance in Freestyle Swimming**

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	Calculated F	Tabular F	Significance Level	Significance of Differences
<b>Between Groups</b>	102.71	2	51.35	12.41	5.15	0.01	Significant
<b>Within Groups</b>	173.73	42	41.13				

The data in Table (02) shows a calculated F-value of 12.41, which significantly exceeds the tabular F-value of 5.15 at a significance level of 0.01. This substantial disparity signifies notable differences between the instructional outcomes of the three groups, confirming that the teaching methods significantly influenced their performance in freestyle swimming.

Further analysis was conducted using the Least Significant Difference (L.S.D) test to pinpoint which groups demonstrated the most effective learning based on their instructional methods, as illustrated in Table (03).

**Table (03): L.S.D Test Results for Post-Experimental Comparisons**

Comparative Groups	Mean Differences	L.S.D Value	Significance
Group 1 vs Group 2	7.2 - 8.6	1.4	Significant
Group 1 vs Group 3	7.2 - 10.8	3.66	Significant
Group 2 vs Group 3	8.6 - 10.8	2.66	Significant

The calculated L.S.D value is 2.009 at a significance level of 0.01. The findings from Table (03) reveal significant differences between the First and Third groups, with the Third group's method of simultaneous arm and leg movements proving superior. Likewise, the Third group surpassed the Second group in terms of effectiveness. While the differences between the First and Second groups were less than the L.S.D value, indicating random variance, the Second group still showed better performance than the First in terms of mean scores.

These tables collectively highlight the Third Group's superior learning outcomes, underscoring the efficacy of integrating simultaneous movements of legs and arms in teaching freestyle swimming to beginners.

## 4-2 Discussion of Results

### 4-2-1 Discussion of Skill Performance Results in Freestyle Swimming

The analysis of Table (03) elucidates marked performance discrepancies among the three experimental groups in freestyle swimming. Notably, the third group exhibited superior skill performance, which can be attributed to their method of simultaneously integrating arm and leg movements with breathing.

This synchronization of movements is crucial for the effective coordination of muscular actions, a process where the nervous system optimally controls and coordinates various muscle groups to produce maximum force efficiently (Abu Alaa Ahmed Abdel Fattah, 1997, p.117).

This group's approach aligns with the perspectives of global swimming experts like James Counsilman, who advocates for holistic learning approaches. Counsilman's endorsement of learning complete swimming motions as a unified whole, rather than in segmented parts, supports the observed effectiveness of the third group's methodology (Osama Kamel Rateb, 1999, p.31).

Similarly, Cecil Coluin concurs that partial learning methods may not necessarily culminate in correct overall performance, further asserting the superiority of holistic approaches in swimming education. This viewpoint is corroborated by Niemyer's study, which posits that holistic learning significantly trumps partial methods in terms of both performance level and speed of learning (Osama Kamel Rateb, 1999, p.31).

In contrast, the second group, which prioritized learning leg movements before arm strokes and finally breathing, displayed less coordinated and incomplete swimming skills. This result is partly because the vertical motion taught for leg strokes does not accurately reflect the diagonal motion essential in actual swimming, potentially causing the swimmers to move backward rather than forward.

This misalignment highlights the critical need for teaching techniques that emulate real-life swimming conditions to prevent the embedding of incorrect practices that could impede the development of proficient swimming techniques (Risan Khreibet Majid, Najah Mahdi, 2002, p.289-290).

## **5 - Conclusions and Recommendations**

### **5-1 Conclusions**

Based on the comprehensive analysis of the research findings, within the constraints of the sample size and the statistical methods employed, the following conclusions are drawn:

1. The educational methodology adopted by the third experimental group, which entailed simultaneous teaching of both arm and leg movements integrated with breathing techniques, is validated as the most effective among the three tested methods for instructing freestyle swimming to beginners aged 6 to 8 years.

2. The strategy utilized by the second experimental group, focusing initially on leg movements followed by arm movements and then integrating breathing, is ranked second in terms of effectiveness for teaching beginners in this age bracket.
3. The approach undertaken with the first experimental group, which concentrated on teaching arm movements first and then leg movements, proved to be the least effective method for teaching freestyle swimming to beginners within the same age group.

These conclusions offer a clear indication of the importance of selecting appropriate instructional methods that align closely with the developmental needs and capabilities of young swimmers to maximize learning effectiveness and speed.

### **5-2 Recommendations**

Within the scope of the study's sample and its methodologies, and in light of the outcomes achieved, the following recommendations are proposed:

1. Emphasize the adoption of a teaching method that simultaneously addresses arm and leg movements when instructing freestyle swimming to children aged 6 to 8 years.
2. As a secondary option, employ the teaching strategy that begins with leg movements before progressing to arm movements.
3. Extend the research to include different age groups and other swimming styles.
4. Implement a longitudinal study that extends the duration of engagement with the different teaching methods.

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