

# International Journal of Physiology, Sports and Physical Education



ISSN Print: 2664-7710  
ISSN Online: 2664-7729  
Impact Factor: RJIF 8.00  
IJPSPE 2024; 6(2): 25-30  
[www.physicaleducationjournal.net](http://www.physicaleducationjournal.net)  
Received: 07-06-2024  
Accepted: 15-07-2024

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## The effect of educational units using snorkel mask on flexibility, kinetic balance, and learning the skills of floating and breathing in swimming for beginners

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DOI: <https://doi.org/10.33545/26647710.2024.v6.i2a.79>

### Abstract

This paper's goal is to create instructional modules utilizing a snorkel mask in flexibility and kinetic balance and learning the skills of floating and breathing in swimming for beginners and to determine the impact of instructional modules utilizing a snorkel mask in flexibility and kinetic balance and learning the skills of floating and breathing in swimming for beginners, as the researcher adapted the experimental design using two equal groups in order to fit the needs of the research. The scientific community made a decision. For those registered in the Waves Swimming Academy in Babil Governorate for the 2023-2024 season, numbering 33 beginners. Using a straightforward random approach, the study sample consisted of 24 novices and represented 72.727 percent of the research population. Each group of 12 beginners was split into two groups, one for control and one for experimentation. One of the researcher's most significant findings is that the use of a breathing mask as an extra tool speeds up the process of learning how to breathe while swimming freestyle. For beginners and that the educational units with auxiliary means have a positive effect on developing kinetic abilities in freestyle swimming for beginners.

**Keywords:** Instructional modules, snorkel mask, flexibility

### Introduction

Many researches and studies have proven the importance of the practical uses of some tools, materials, devices and various auxiliary exercises, whether individually or together, in learning processes in general and kinetic learning in particular. This importance was evident in helping individuals, teachers and learners, to understand and pass the various educational stages and contributed to reducing effort and costs and shortening the time to reach the desired goals of those processes and stages. Swimming movements of various types are considered among those skills or movements whose performance requires the acquisition of good coordination ability by the learner to be able to perform parts or movements of that skill with high coordination, which can be achieved with the help of various educational means, especially the use of coordination exercises and developing the learner's ability to perform more than one movement for different parts of the body at the same time. The learner acquires kinetic abilities through his interaction with the environment or is present, such as agility, flexibility, balance and coordination, meaning that his ability to move comes and develops through exercise. It is also known as "the individual's current, acquired and innate ability to perform kinetic skills, and kinetic abilities are affected by heredity, the environment and its variables, and they determine the latent kinetic potential of the individual or His ability to succeed in completing any kinetic task and predicting his proficiency. Flexibility, along with other kinetic abilities, constitutes the basic pillars on which the acquisition and mastery of kinetic performance is built. Experts confirm its importance in kinetic performance from both quantitative and qualitative aspects. In addition, the ability to be flexible is among the fundamental tenets of the educational and training procedure and cannot be dispensed with. Flexibility is linked to the work of the muscles in addition to the work of the joints, as the range of joint movement determines the ability of the muscles and ligaments working on elasticity. Thus, it can be said that flexibility is a matter that concerns the joints, while elasticity is a matter that concerns the muscles. The lack of flexibility exposes the learner or player to injury determining the range of motion in

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the muscles and joints as well as movement for them. It also negatively affects the development of other qualities. From this standpoint comes the importance of research in preparing educational units using a snorkel mask in flexibility and kinetic balance and acquiring the abilities of floating and breathing in swimming for beginners.

### Research problem

Most of the movements and skills in various sports, especially swimming movements, are complex movements that depend on learning and mastering them on developing the learner's ability to coordinate, which helps him link those movements and perform them in the form of an integrated skill to achieve the goal and kinetic duty, especially flexibility and balance, to achieve and master the most important skills of freestyle swimming, which are breathing and floating. Through the researcher's follow-up of learners in summer courses and with the help of trainers in these courses, he found that there is difficulty in coordinating between arm movements, leg strokes and breathing, in addition to not using various auxiliary means and exercises during the learning stages, especially with beginners in learning during practical lessons of the subject, which prompted the researcher to study this problem by preparing educational units using a snorkel mask and knowing its effect on balance and kinetic flexibility for beginners in freestyle swimming.

### Research objective

- Preparing educational units using a snorkel mask in flexibility and kinetic balance and learning the skills of floating and breathing in swimming for beginners.
- Identifying the effect of educational units using a snorkel mask in flexibility and kinetic balance and learning my skills of floating and breathing in swimming for beginners.

### Research hypotheses

Positive effects can be observed from educational units using snorkel mask on flexibility and kinetic balance and acquiring the abilities of floating and breathing in swimming for beginners

### Research fields

- **The human realm:** Beginners belonging to Waves Swimming Academy in Babylon Governorate for the

2023-2024 season

- **Time field:** (3/7/2024) to (9/8/2024)
- **Spatial field:** The indoor Spanish pool in Babylon Governorate.

### Search terms

#### Snorkel mask

It is a type of diving equipment and can be used as an educational tool that allows breathing underwater without having to raise the head to breathe. It is designed to imitate the human face. It is provided with two flexible adjustable straps to fit the size of the head and prevent water leakage. It contains a tube that includes three channels that work to bring in fresh air and expel carbon dioxide through valves that work automatically on the principle of floating bodies to close the tube during diving and an opening during ascent to prevent water from entering the swimmer's mouth and allows breathing naturally through the nose and mouth (Mazen Kazem Naseef. 2023) <sup>[4]</sup>.

### Research methodology and field procedures

#### Research Methodology

To fit the nature of the investigation, the researcher employed the experimental approach with two comparable groups.

#### Community and sample research

The community of researchers was established by those affiliated with Waves Swimming Academy in Babylon Governorate for the 2023-2024 season, numbering 33 beginners.

#### Research sample

Simple random selection was used to choose the study sample, which consisted of 24 novices and a percentage of 72.727%) of the research population. The participants were split into two groups (control and experimental), with 12 beginners in each group.

### Homogeneity and equivalence of the sample

#### Homogeneity of the sample

The researcher homogenized the sample with the dependent variables (Length - weight - age), to ensure starting from one starting line, and the following table shows this. The arithmetic mean, median, standard deviation, and skewness value for the skills under study are displayed in Table 1.

**Table 1:** Descriptive Statistics of Homogenized Sample Variables: Length, Weight, and Age

Variables	Measuring unit	Mean	Median	Std. Deviations	Skewness
Length	Cm	157.40	155	3.89	0.86
Weight	Kg	55.27	55	5.03	0.63
Age	Year	15.46	15.50	1.47	-0.26

Table (1) makes it evident that every value of the skewness coefficient was smaller than one (1) integer, confirming the homogeneity of the study sample.

**Sample equivalence:** The researcher equalized the sample

in the dependent variables (kinetic flexibility, balance, Floating, and breathing) as shown in the following table: The arithmetic mean, median, standard deviation, and skewness value for the skills under study are displayed in Table (2).

**Table 2:** Comparison of Flexibility, Balance, Breath-Holding, and Floating Skill between Control and Experimental Groups

Variables	Measuring unit	Control group		Experimental group		T value calculated	Level Sig	Type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Flexibility	cm	18.833	1.267	19	1.477	0.297	0.770	Non sig
Balance	second	6.333	0.651	6.167	0.718	0.596	0.557	Non sig
Breath-holding	second	3.250	0.544	2.958	0.656	1.186	0.248	Non sig
Floating skill	second	2.542	0.620	2.417	0.515	0.537	0.596	Non sig

Table (2) makes it evident that all (Sig) values are more than (0.05) and that the computed (t) value is smaller than the tabular (t) value, confirming the equivalency of the two groups.

### Methods, devices and tools used in the research

#### Data collection methods

- References and Arab and outside sources.
- Individual interviews
- Questionnaire.

#### Devices and tools

- Respirator mask number (4).
- Laptop type (HP) number (1).
- Medical scale for measuring weight number (1).
- Camera type (Sony) number (2).
- Electronic stopwatch number (2) type (CASIO) made in Japan.
- Measuring tape length (25) meters and length (2) meters.
- Colored hoops number (24).
- Colored balls number (6).
- Swimming goggles, number (12). 10- Rescue and safety tools (life line, floating ring, rescue collar, rescue stick).

### Field research procedures

#### Tests used in the research

##### Kinetic flexibility test: (Muhammad Ali Ahmad Al-Qat. 2000)

- **Test name:** Shoulder flexibility test.
- **Test purpose:** Measure shoulder flexibility.
- **Tools used:** A column graduated in centimeters, fixed vertically on the ground so that the zero graduation is parallel to the ground, attached to the column a small bar parallel to the ground and movable on the holder up and down the ruler.
- **Performance description:** From a supine position, the arms are high and the hands are holding a ruler so that they are parallel to the ground, the tester raises the arms backwards to the maximum possible distance without bending the elbows, and the judge sitting in front of the tester moves the lower surface of the ruler held by the tester.
- **Recording:** The tester's flexibility is the distance from the ground to the bar touching the lower surface of the ruler held by the tester, the distance is calculated in centimeters.

##### Balance Test: (Ya'rab Khayoun. 1987) [11]

- **Test Name:** Running on the Balance Beam.
- **Test Purpose:** Measure kinetic balance.
- **Tools Used:** Balance Beam and Stopwatch.
- **Performance Description:** The tester attempts to run from a starting point four distances from the end of the

beam, and the test terminates when the tester crosses the end.

- **Recording:** The tester is given two tries, as well as the attempt with the shortest time is counted.

##### Breath-holding Skill: (Osama Kamel Rateb. 1998) [8]

- **Test Purpose:** Measure the ability to hold one's breath.
- **Tools Used:** Swimming Pool, Stopwatch, Whistle, Registration Form.
- **Performance Description:** The beginner stands inside the swimming pool, and when the starting whistle is heard, the learner holds the edge of the pool, takes a deep breath, then holds his breath, and his head is completely in the water.
- **Recording:** The breath-holding time is measured in seconds and parts thereof.

##### Water Floating Test: (Omar Adel Saeed. 2004) [7]

- The test's goal is to gauge a person's capacity for float in water.
- **Tools used:** Swimming pool, stopwatch, whistle, registration form.
- **Performance description:** The tester stands inside the swimming pool at the beginning of the pool in shallow water, and when the start signal is given, the learner takes a deep breath and holds the air in the lungs, then bends forward and remains in the floating position for the longest possible time, provided that the body remains in the horizontal floating position, then returns to the initial position (standing).
- **Test conditions:** The learner performs two tries and the most successful one is taken.
- **Recording:** The performance of Floating and time are measured in seconds and parts thereof.

### Snorkel Mask

It is a tool designed to surround the human face to match the size of the head and prevent water leakage. It contains a tube that includes three channels that work to bring in fresh air and expel carbon dioxide through valves that work automatically on the principle of floating bodies to close the tube during diving and open it during ascent to prevent water from entering the swimmer's mouth. The goal of manufacturing the breathing mask by the manufacturing companies for water tourism by wearing it and enjoying the picturesque views of the coral reefs, and from here the idea crystallized to use it for the first time in Iraq according to the researcher's knowledge of the process of learning to swim.

#### Description of the snorkel mask tool

- There is a Floating ball at the top of the tool that closes the air path when diving, which prevents water from entering the beginner's mouth, and when coming up again, it opens the air path to flow again.

- The inner lining of the mask is made of soft medical silicone that fits the face perfectly to prevent water leakage, so it is equipped with three silicone rings to prevent water leakage in an excellent way, and it is also equipped with a comfortable elastic band to fix the mask on the face through a lever on both sides of the straps.
- The mask is designed to resist carbon dioxide by having double air flow channels with separate channels for inhalation and exhalation, so the air flows away from the main vision mask and helps get rid of the effects of fog, allowing you to dive for a long time, fresh air is inhaled through the middle channel and when exhaling, carbon dioxide is discharged from both sides of the channels to the outside, so you can breathe easily, and you can also breathe through the nose and mouth as if you were on land, which makes it easy to use in the process of learning swimming skills, especially those that require kinetic coordination.
- Comprehensive vision within a range of 180 degrees by containing a flat anti-break lens made of (polycarbonate), and the mask also contains valves that work to expel water outside the mask in the event that water enters the inside and works to prevent fog, which provides safety and security for the user.
- The mask consists of several measurements and the measurement can be based on the distance confined from the top of the bridge of the nose to the bottom of the chin.

### Exploratory experiment

On March 7, 2024, the researcher conducted an exploratory experiment on five novices who were not part of the main study sample in order to identify potential challenges and impediments that may arise during the implementation of the major experiment. As if its goal was:

- Verify the efficiency and breathing mask.
- Determine the amount of time spent on each test and the overall test duration.
- Know the level of difficulty of the tests for the research sample.
- Know the difficulties facing the researcher in order to avoid them in the future.

### Main research procedures

#### Pre- measurements

Pre-tests were conducted in kinetic abilities (kinetic flexibility, kinetic balance, and two tests of breath-holding and Floating skills in water on the two study groups (control, experimental) with the numbering (24) and were carried out at four o'clock in the afternoon on Friday and Saturday, which correspond to (6-5/7/2024). Spanish pool in Babylon Governorate.

#### Educational units

The educational Ten instructional units were included in the program, with two units every week. (Monday and Wednesday) and used a total time of (15) hours at a rate of (90) minutes for each educational unit that included divisions of what the educational unit requires, and the vocabulary of the educational units is based on special exercises using a snorkel mask that takes into account breathing and balance exercises that help in achieving the

required goals. The researcher took into account the following:

- The ages of the research sample members.
- The time of the educational unit.
- Diversity Small games (outside the water - inside the water).
- Progression from easy to difficult.

#### The educational unit was divided into

**Preparatory:** It included land and water warm-up, registering names, distributing beginners, and showering before entering the pool, and it took (20 minutes).

**main part:** This part included a set of exercises outside and inside the pool, which included exercises outside the pool related to skill and performance for preparatory exercises, especially for flexibility and balance, and to raise the physical and preparatory level for entering the pool, and included leg and arm movements and the breathing process using the Snorkel Mask, as well as during the performance of educational duties outside the pool related to sensory-kinetic performance to learn freestyle swimming skills. As for inside the pool, sensory-kinetic exercises were conducted related to performing the skill according to what the performance required, and special exercises were developed to learn the breathing skill using the Sunokel Mask tool with leg movements and linking them to the swimming movement using the pool for learning freestyle swimming, and this part took (60) minutes.

**Final part:** It included exercises related to removing tension and effort on beginners and took (10 minutes) for each educational unit.

The implementation of the educational curriculum continued for a period of (5) weeks, as it began to be applied to the sample individuals on Monday (8/7/2024) at four o'clock in the evening and ended on Wednesday (7/8/2024) at six o'clock in the evening, in the Spanish Club swimming pool in Babylon, as in Appendix No. (1), which includes a model for the ninth educational unit using a snorkel mask.

#### Post-measurements

The researcher conducted the dimensional measurements on Thursday and Friday 8-9/8/2024 in the Spanish pool precisely at four in the afternoon. The tests were conducted in the same manner as the pre-measurements.

#### Statistical methods used in the research

The following were employed by the researcher while using the statistical bag to get at the conclusions based on the data that they had collected:

- The mathematical mean.
- The median.
- Variation in standard.
- The correlation coefficient of Pearson.
- T-test.

### Results and discussion

#### Results

#### Presentation and evaluation of the pre- and post-test findings for the kinetic abilities tests of the experimental group

The arithmetic means and value of (t) for the pre- and post-test results in the experimental group's kinetic abilities are displayed in Table (3).

**Table 3:** Pre- and post-test comparison of flexibility, balance, breath-holding, and floating skill with statistical significance

Variables	Measuring unit	Pre-test		Post-test		T value calculated	Level Sig	Type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Flexibility	cm	19	1.477	25.833	1.337	11.371	0.000	Sig
Balance	second	6.167	0.718	2.917	0.409	12.198	0.000	Sig
Breath-holding	second	2.958	0.656	2.021	0.212	7.987	0.000	Sig
Floating skill	second	2.417	0.515	1.997	0.321	3.876	0.001	Sig

As the value of (sig) was less than (0.05), Table (3) verifies the substantial statistical differences favoring the post-test. It demonstrates that there are significant differences between the pre- and post-tests in the skills tests under consideration.

The arithmetic means and value of (t) for the pre- and post-test results in the control group's kinetic abilities are displayed in Table (4).

**Table 4:** Statistical comparison of pre- and post-test results for flexibility, balance, breath-holding, and floating skill

Variables	Measuring unit	Pre-test		Post-test		T value calculated	Level Sig	Type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Flexibility	cm	18.833	1.267	24.583	1.084	12.894	0.000	Sig
Balance	second	6.333	0.651	4.3	0.603	7.532	0.000	Sig
Breath-holding	second	3.250	0.544	3.021	0.121	3.897	0.022	Sig
Floating skill	second	2.542	0.620	2.217	0.876	5.998	0.032	Sig

As the value of (sig) was less than (0.05), Table (4) verifies the substantial statistical differences favoring the post-test. It demonstrates that there are significant differences between the pre- and post-tests in the skills tests under consideration.

#### Presentation and evaluation of the post-test findings in kinetic abilities for the experimental and control groups

Table 5. Arithmetic averages and the value of (t) for the control and experimental groups' post-test scores on kinetic abilities

**Table 5:** Post-Test Comparison of Kinetic Abilities Between Control and Experimental Groups: Arithmetic Means and Statistical Significance

Variables	Measuring unit	Control group		Experimental group		T value calculated	Level Sig	Type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Flexibility	cm	24.583	1.084	25.833	1.337	2.516	0.020	Sig
Balance	second	4.3	0.603	2.917	0.409	5.152	0.000	Sig
Breath-holding	second	3.021	0.121	2.021	0.212	5.555	0.000	Sig
Floating skill	second	2.217	0.876	1.997	0.321	7.093	0.000	Sig

Table (5) makes it evident that all pre- and post-test variations in the kinetic skills of the experimental and control groups are significant differences since the experimental group's significance threshold is less than 0.05.

#### Discussion

Table (3) (4) (5), in particular, makes it evident that there has been a discernible improvement in the skills learned and that the experimental and control groups have fared better on the post-test. It also makes it evident that the experimental group has fared better in the two-dimensional tests compared to the control group.

The investigator notes this difference in the experimental group as a result of using educational units supported by a snorkel mask, which has clearly contributed to kinetic abilities, as it added a spirit of fun, joy, and excitement and created an atmosphere of competition in the educational units, and contributed to attracting the attention of beginners and stimulating their motivation towards more effort and not feeling tired during the learning process, as it allowed beginners to have situations similar to the situations they encounter while learning many skills, and this is consistent with what was indicated by (Edwards, H.1994) [2] that the use of small auxiliary means contributes to learning big games and discovering their skills in a faster and more exciting way, as it develops physical and kinetic qualities, and it is consistent with (Ronald, 2008) "Learning through means, tools and water games is one of the forms of

learning, and it is approaching learning to help the learner develop the basic movement capabilities for that activity, as indicates that "the use of educational means in learning sports skills has helped in learning and saved a lot of time and effort" (Larry Kats. 2004) [3]. The researcher attributes this to The effectiveness of applying educational units with aids that targeted breathing through performing breathing, which is the basic starting point for learning swimming skills and other swimming, and this was confirmed by " that the basic requirement for the novice learner is breathing, and through it the learner gains the confidence that leads to learning various basic skills" (Muhib Hamid Al-Hadith and Hussam Abdul Muhi. 2020) [6].

The effectiveness of the (breathing mask) led to the experimental group outperforming the control group in the breathing skill, which played an effective role in keeping the body at a horizontal level by keeping the head at the water surface level because the body is a lever of the first type, if one of its ends rises, the other ends descend, and this is what indicated, that the mistake of most beginners is that they learn by raising the head, which leads to the feet falling down (Qasim Hassan Hussein and Ifikhar Ahmed. 2000.) [9]. The effectiveness of the educational units using the (breathing mask) contributed to the speed of learning the skill, which led to saving time and effort, and this was confirmed by "that diversification in the use of means contributes effectively to learning swimming skills (Wafiqah Salem, 1997) [10].

The use of educational aids applied in learning the breathing skill, which helped in accelerating learning and improving the skill performance of beginners (uhammad Ali Ahmad Al-Qat. 2000) [5], this was confirmed " that interest in aids returns a great benefit to the learning process, as it appeared that their use increases the depth of the educational effect Accelerating learning and development with the least possible effort and high proficiency (Abbas Ahmed Al Samarrai and Abdul Karim Al Samarrai. 1991) [1].

## Conclusion and Recommendations

### Conclusion

- The aids (breathing mask) snorkel mask have a positive effect on the speed of learning the breathing skill in freestyle swimming for beginners.
- The educational units with aids have a positive effect on developing the kinetic abilities in freestyle swimming for beginners.
- In freestyle swimming, the experimental group did better than the control group in the areas of breathing, floating, kinetic flexibility, and balance.

### Recommendations

- The necessity of using modern means and tools in learning freestyle swimming for beginners.
- The researcher recommends using the snorkel mask in teaching beginners the basic skills of freestyle swimming for beginners.
- The use of educational programs with educational means and modern devices for beginners has a great effect on the speed of adaptation to the aquatic environment.

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